COAL AGE

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Hold Up the Hands of Your Leaders

MEN of the bituminous coal industry, your leaders are demonstrating their ability to lead. They are giving you a straightforward, honest program and they are fighting for it every inch of the way. It is up to you to follow with no hanging back. The men who are leading this fight are two-fisted, determined and wise. They are shaping their policy from the national viewpoint, for which you selected them as officers of your national association.

These men are sufficiently burdened with harmonizing your problems with the requirements of the railroads, the exactions of Government and the demands of consumers. Keep your petty, selfish objections locked up at home. The worst enemy of the coal industry today is the man who, his head turned by $10 coal, is saying that he will fight to the limit any move to make him ship to the Lakes or elsewhere. The blackest sin is not that you charge $10 for a ton of coal, but that you for an instant refuse to forego the sale of a single such ton in meeting the program that your leaders have adopted for the distribution of your product.

The full story may never be told of how close the coal industry has been, and is even yet, to renewed Government control and regulation. The interests that would have the authorities at Washington take over distribution and regulate the prices of coal are powerful and have good arguments and urgent necessities to back their request. Failure to meet the situation fully, to get coal to the Northwest, New England and to other sections and to preferred consumers, means Federal supervision before the winter is over, if its coming can be postponed that long.

"The coal industry is at a crossroads," Mr. Morrow has told you. "It will either go forward along the splendid pathway of individual enterprise and initiative or it will find itself treading the rocky pathway of everlasting Government regulation and control. The ability of private enterprise in this business and private enterprise in the management of railways is faced with a test of its sufficiency." Mr. Morrow says that failure at this juncture would justify Federal intervention, but he adds that there will be no failure. He asks you as shippers of coal to cheerfully accept the sacrifices necessary to put the program through.

Of course the fault is lack of transportation, but read this to the editor from one of your number whom you all know—we suspect it was inspired by the meeting of coal operators in Washington on July 12 and 13:

"Concerning the present coal supply situation, it occurs to me that too much damning of the railroads is going on and not enough careful, restrained thought given the matter of co-operation. It is my impression that the present shortage of transportation service cannot be blamed entirely upon the officers and executives of the railroads. Back of it there is a labor unrest which, until abated, will prolong the condition we now face. Railroad managers are as helpless to eradicate that evil as the coal operators were to make the miners work last fall. It is time, therefore, that some spirit of co-operation and helpfulness be fostered. The present epidemic of passing the buck has gained in momentum and will be a boomerang if a stop-gap is not furnished.

"Coal operators say their troubles are all a result of transportation, which, of course, is largely true; but to solve all difficulties they say: 'Give us 100-per cent service and everything else will solve itself.' *That is pure selfishness.* It is time some of us were doing something constructive instead of laying back and demanding that 'George do it'."

Orders Nos. 10 and 11 are designed by coal men, concurred in by the railroad officials and promulgated by the Government. They are your own orders, issued to yourselves. If they do not work it will be for the reason that sufficient of your number repudiate your leaders, and by so doing condemn your industry and your own business to some other form of control. These orders will not put the coal into the Northwest and into New England. You must do that. The orders are but an attempt to make you all go share and share alike in this venture.

England has had control of coal for a long time. The Government is trying to let go and give the business back to its owners. Reflecting on the difficulty that is being encountered, Sir Adam Nimmo, K. B. E., has just stated "It must be admitted that it is easier to put an industry, like the coal industry, under control than it is to set it free. Knots are comparatively easily tied, but very difficult to unloose."

The Role of Coal in World Peace

WITH an acute coal situation characterized by an almost continuous succession of complaints, pleas, and resultant priority and assigned-car orders to keep us on the anxious seat, it would scarcely be surprising if Americans had overlooked preliminary moves at the meeting of the Reparations Committee with German delegates at Spa. Agreement by Germany to the terms of the coal ultimatum of the Allies in any case will be matter for gratification in tending toward a settlement of the world's fuel problem.

It was to have been expected that the Teuton representatives would picture gloom and disaster to Germany as the inevitable concomitants of enforcement by the Allies of the terms of the treaty in the matter of supplying coal to France, with the usual outbursts of arrogance in unwary moments—tactics now recognized as salient features of Teuton diplomacy. In that regard the recent seekers of a place in the sun can always be depended on. The Germans displayed poor judgment, however, in selecting Messrs. Lloyd George, Millerand and Delacroix to humbug, as Herr Stinnes perhaps realizes now.

The original terms called for 2,200,000 tons of coal monthly for the use of France, Belgium and Italy, but in the course of the proceedings this was reduced to 2,000,000 tons, beginning Aug. 1. A stipulation that if deliveries fall below 6,000,000 tons for the first three months the Allies will occupy a further portion of German territory, either the Ruhr or another, should go far toward insuring strict compliance with the main terms of the indemnity.

How utterly without foundation are the prophecies of economic disaster that would be entailed by compliance with Germany's fuel obligations is conclusively shown in a study of the coal resources of that country by the U. S. Geological Survey and F. G. Tryon, printed in *Coal Age* Sept. 25, 1919. According to Mr. Tryon's data, the Westphalian coal field and four smaller bituminous fields, exclusive of the Sarre and Upper Silesia, have a normal annual production of 130,000,000 tons. In addition there are lignite mines with large reserves, a resource of great economic importance in the industrial life of Germany. At the same time the fact should not be lost sight of that a portion of the fuel reparation is certain to go to localities like Alsace-Lorraine—formerly German—which the Fatherland would have had to supply even if it had not been defeated in the war.

Whether Poland or Germany wins the Silesian plebiscite the Allies have assured Germany of a coal supply from that region also. An agreement, in fact, has been reached for immediate distribution of Silesian coal by a committee on which Germany shall be represented.

As none of the ravages of hostile invasion reached German mines and as Teuton aspirations to commercial and industrial supremacy are unextinguished—though retarded—a matter of 24,000,000 tons of coal per annum falls far short of disaster—save to pride, perhaps. The agreement made by the Allies to advance a loan of $100,000,000, based on the value of coal deliveries, and to feed the German mine workers, however, should go far toward soothing the injured feelings of the Teuton delegates. If further assurance were necessary it is to be found strikingly set forth in the arrangement recently perfected whereby Switzerland is to receive 40,000 tons of coal monthly from Germany.

With the assistance of Great Britain, Belgium and the United States, which have agreed to supply 750,000, 100,000 and 250,000 tons, respectively, the fuel needs of France will almost be met. Italy's requirements may be more difficult to supply, and Norway and Sweden also have coal problems, though a solution for the latter's may be foreshadowed in the recent delivery of coal from Australia—and at a lower price than has been paid for British coal.

All in all there is considerable ground for suspecting that the black man in the world's economic woodpile is named Coal.

Climbing Up the Golden Stair

THERE is no limit to climbing upstairs so long as one foot can find a purchase whereby to lift up the other. The mine workers' union long ago ascertained that interesting fact. It progresses just like any other biped which climbs stairs, for it has two legs, one anthracite and one bituminous, and it uses them alternately.

It lifts itself on the bituminous leg, using as a besinewed lever the fact that a man must make enough to live whether he works or rests and that what he earns should be based on his needs and not on his opportunities to labor. Then it rests on its bituminous leg, and uses the lever in its anthracite extremity to lift itself another step on the stairway. That lever is the "law" that as a man should not be penalized for working steadily he should make as much per day or unit of work whether he is a steady worker or a perforcedly casual one.

And the system of the union for raising wages works like walking up a stairway! The public is not sure what it believes, consequently it changes its belief with either argument as it is advanced. Now it is the right to live in comfort; then it is the right to equal pay for equal work. The public drifts along without a program and labor goes on up the golden stairs that lead to—higher prices—or a dislocation of business.

The unions—as also some others—always use the argument that will serve them the best. When cost of living rises they argue wages must go up. What will happen when prices fall? The union has an answer. It says that, whatever happens, never must wages be lowered. Labor claims that during the war the mine workers' wages rose less rapidly than the cost of living and that wages should be lifted to remunerate the mine worker for his lean years. The operator denies that the so-called lean years were lean, and every evidence points to the truth of that contention. But if by any chance a remuneration were provided in the form of an increased wage, would the mine worker consent to its removal after the lean-year deficits were fully met, and would he agree to allow a deduction for excessive earnings should the cost of living go down in advance of a decline in his pay? He assuredly would not.

We can hardly wonder at the mine worker's cunning use of changes in prices, inequalities in working hours, and irregularities such as seam thickness, purity and hardness to help himself upward in the standard of living at the expense of the public. But the public should form some judgment as to the conflict between the right to a living and the right to unit prices, the right to equal pay for equal product or the right to equal pay for equal effort, the right to have wages raised with living cost and the right to maintain wages regardless of living cost.

Transit Company's Coal Bill Increases 147 Per Cent

The Interborough Rapid Transit Co. of New York has announced that its coal bill for the fiscal year 1920 was $4,245,000, compared with $1,716,696 in the corresponding period of 1916. The company does not explain, however, what portion of the increase of 147 per cent in the total cost of fuel is due to increase in amount of coal used and what portion to increase in price per ton.

Germany Gets Good Terms For Her Coal

An Associated Press dispatch from Spa July 15 says: "The German Ministers are disposed to accept the note of the Allies and to answer in the affirmative tomorrow without qualification." The New York *Times* says: "Roughly speaking, the settlement is this: Germany agrees to deliver the 2,000,000 tons of coal monthly the Allies demanded. On the other hand, she gets a loan of about $80,000,000, based on the value of her coal deliveries, together with other concessions."

Price of Fuel Oil Raised at Panama Canal

A. L. Flint, chief of office, the Panama Canal, Washington, received the following cablegram July 16 from the Governor of the Panama Canal: "Price of fuel oil at Canal terminals will be increased to $3.50 per barrel effective Aug. 1, 1920. Bunkers will be limited to sufficient oil to reach next bunkering station. This will apply to all ships, whether they have contracts with local oil companies or not."

Senate Committee Holds Coal Hearing in New York

Senator William M. Calder, of New York, chairman of the Senate Committee on Reconstruction and Production, is holding hearings in New York on the coal situation. Mr. Storrow, Mr. Groverman and Judge McGee are among those who have been called to testify.

Movement of Coal to New York Continues to Improve

Movement of bituminous coal to New York, according to an official of the Tidewater Coal Exchange, continues to improve slightly, but is still far from normal. It was reported July 21 that there were 4,253 cars of soft coal at tidewater ports which was being unloaded at the rate of about 425 cars a day. There is less delay in dumping and delivering now because harbor conditions have improved. Public Service Commissioner Lewis Nixon gave out the weekly report of coal on hand from the public utilties companies July 20, showing a total of 239,041 tons. This is an increase of 18,000 tons over the preceding week, when the companies reported 220,396 tons on hand.

Shipping Board Receives Bids on 122,553,000 Barrels of Oil

Approximately 122,553,000 barrels of oil were offered the U. S. Shipping Board July 15, when bids for 1-year, 3-year and 5-year supplies of such fuel were opened.

Steel Trade Expects Relief with Rail Wage Settlement

In its weekly summary of conditions in the steel market as of July 22 the *Iron Age* says: "Appraisal of the effect of the 21-per cent advance in railroad wages is not easy in the absence of clear indications of the attitude of the unions. In the steel trade the more general opinion is that with the award retroactive for ten weeks and in view of its amount a widespread strike against it is not likely. The increasing signs of reaction in various industries are cited as having an important bearing. Steel manufacturers look for some relief from the desperate conditions of many weeks with the return to work of experienced railroad workers, but it is recognized that improvement will be slow and it is admitted that the accumulations of product are more than have been commonly known."

NEWS BRIEFS

Terse Items Chronicling Events of Interest to the Industry

Says Operators Get Excess Profits of $350,000,000 a Year

J. J. Storrow, Massachusetts Fuel Administrator, before the Congressional Committee on Reconstruction and Production, July 20, demanded a rigid government embargo on coal, following the policy of the British Government in restricting the amount of coal that goes out of the country proportionate to the amount needed for domestic use as a remedy for the present fuel situation. He charged that coal operators were taking in excessive profits from American people as much as $350,000,000 a year.

South America to Obtain British Coal

According to advices to the Department of Commerce export of coal from Great Britain to South America will not be prohibited.

Sweden Gets Australian Coal More Cheaply Than British

A British firm has completed the sale of 240,000 tons of Australian coal to Sweden, which, including all freight charges, will cost Swedish buyers in the neighborhood of $36 a ton, whereas British coal delivered in Sweden costs about $44 a ton.

New York Manufacturers Report Higher Efficiency of Labor

The efficiency of labor is increasing, according to reports from forty-nine manufacturers operating in forty different lines of industry in New York City. This testimony is submitted to the Industrial Bureau of The Merchants' Association by manufacturers who reported in September, 1919, that labor was about 70 per cent efficient.

To Assist in Super-Power Investigation

Mr. O. P. Hood, chief mechanical engineer of the Bureau of Mines, has been designated as one of the engineering staff to co-operate with the Geological Survey in its investigation of the super-power project.

Eastern Roads to Help Move Western Grain Crop

The Commission on Car Service has ordered the movement of 25,500 additional serviceable empty box cars from Eastern and Southeastern roads to Western lines to assist in handling new grain crops for a 30-day period beginning July 25.

Morrow Warns Operators Against Government Goblin

J. D. A. Morrow, vice-president of the National Coal Association, warns bituminous-coal operators that failure to meet the urgent fuel needs of the country at this time will mean continuous government control of the industry. Mr. Morrow urges immediate increased production and co-operation with the Interstate Commerce Commission in getting coal moved to the Northwest, New England and upper New York.

Car Relocation Orders To Be Made Mandatory

The Commission on Car Service of the American Railroad Association has issued a circular to the roads which suggests a method by which orders issued by it for relocation of cars between railroads may be made to have practically the same mandatory effect as orders of the Interstate Commerce Commission.

John Callahan

Traffic Manager, National Coal Association

WHEN it is considered that coal to the value of one and one-half billion dollars is transported on the railroads each year, the position of the traffic manager of the National Coal Association carries with it no mean responsibility. While all the coal transported is not the product of members of the National Coal Association, the efforts of that organiation to secure better transportation conditions have their bearing on all coal shipped. This work is in the hands of John Callahan.

The fact that there are many complex and difficult problems arising in an industry where the product comes from thirty-one states, and every railroad, large and small, is engaged in its transportation, does not worry Mr. Callahan. He looks after a multitude of individual complaints in addition to his more important activity of trying to secure the adoption of many fundamental principles which make for greater efficiency in the transportation of coal. He may or may not know that the railroads last year handled 435,543,226 tons of revenue producing coal, but he is entirely familiar with the rights of the coal shipper, as representatives of the carriers have ample reason to know. Very frequently he is a thorn in the side of the Interstate Commerce Commission until it changes its views on matters which affect the transportation of coal.

Mr. Callahan was born in Leetonia, a little mining town in northeastern Ohio. His early education was obtained a few miles away at Salem, Ohio, where he completed the high school course. Immediately thereafter he accepted employment as a yard clerk at Salem for the Pennsylvania Railroad Co. For several years he worked in various capacities in the yard service and in the train service. Later he was assigned to divisional work on the same line.

Mr. Callahan feels that one of the most interesting portions of his experience came during the time that he was assigned by the Pennsylvania Company to travel over the lines of other roads with the idea of observing methods and practices which could be applied to advantage on the Pennsylvania. His next step upward came in an appointment as special agent in charge of the Pennsylvania's fast freight service. Later he was made inspector of freight transportation for all Pennsylvania lines west of Pittsburgh. He resigned in November, 1917, to take service with the National Coal Association as traffic manager.

Special Cars at Illinois Mine Promote Safety and Aid Operation

At Most Operations Mine Cars Are Used for Transporting Materials of Every Description—Special Cars Do This Work Better and Release Regular Equipment to the Purpose for which It Was Intended

By Donald J. Baker
Wilkinsburg, Pa.

IN THE design of mine cars for specific purposes Illinois operators have shown themselves resourceful and inventive. The ordinary mine car was designed and constructed for the one purpose of transporting coal, but the average layman might not receive that impression if he were to visit certain operations and see such cars used for transporting everything from hay to sand. No great amount of ingenuity is needed to build a special car for a special purpose and thereby provide an efficient carrier for materials of a distinct class. For instance, a covered car should obviously be employed in the transportation of powder or permissible explosives, as many concerns have learned through grim experience.

All the cars herein illustrated are in active service in the mines of the Saline County Coal Co. in southern Illinois and any of them may be constructed in such a shop as is usually found at the mines. With the exception possibly of the tank car all would find ready use in any mine. Such equipment will last almost indefinitely once it is constructed and will render a distinct service meanwhile. The cars are of simple construction and require no elaborate bills of material. With such rolling stock available any demand within the mine for a certain class of material may be effectively met.

An efficient transportation system counts for little if it does not provide that the material shall be delivered in proper condition. Hence the use of a special car. A potent factor for safety is introduced also when a covered car is used for moving explosives or transporting hay. The Illinois Mining Law demands that such cars be employed, but the statutes of other states are not so rigid. Far-sighted operators, however, in any coal field will employ them regardless of whether the law in their particular district calls for them or not.

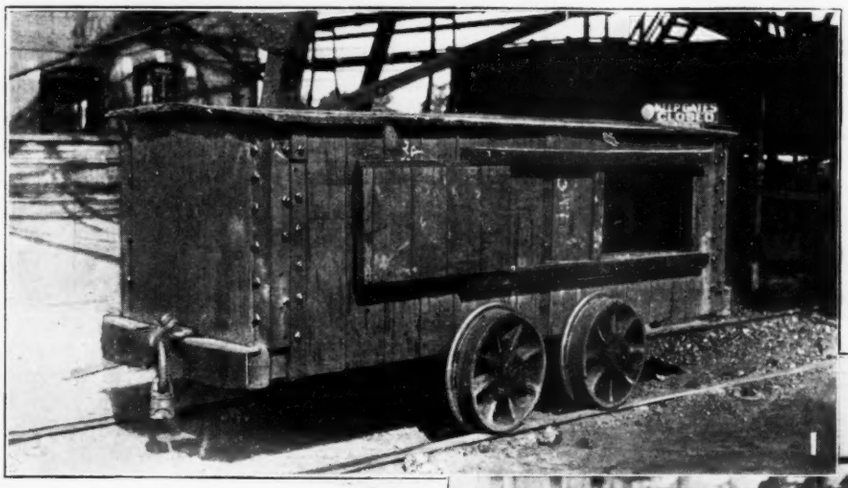


FIG. 1.

Powder Car

In which powder is taken from the surface and placed in the neck of every working room where it is needed. The door on the near side is at the rear end of the car, on the far side it is at the front end, but out of sight.

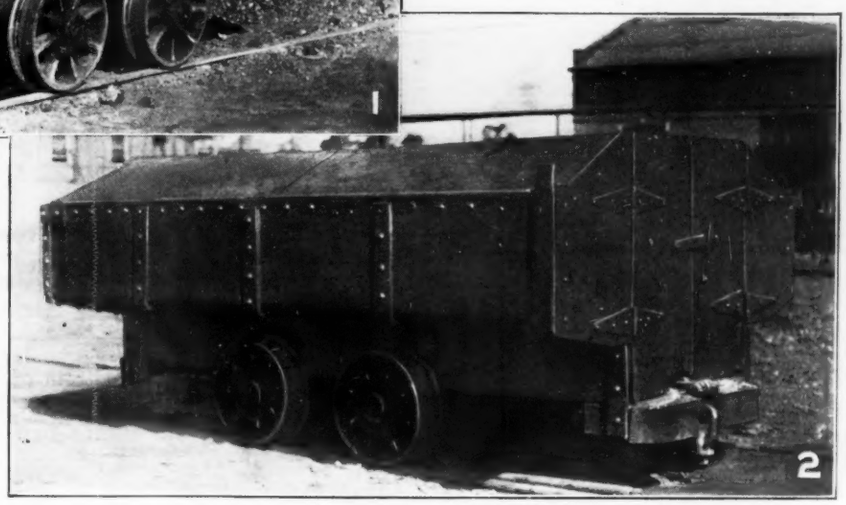


FIG. 2.

Hay-and-Grain Car

Where mules are kept below ground hay or grain must by law be sent down in a closed car. The terrible Cherry disaster of Nov. 13, 1909, was caused by an open torch igniting a carload of hay on its way to the mine stable.

Miner Finds Powder at His Room Neck

Fig. 1 shows a car that is used exclusively for transporting explosives. It is solidly constructed of planking and entirely covered. Access to the interior is gained through two doors located diagonally opposite each other near the end of each side. These are of the simple sliding type without hinges or other devices that

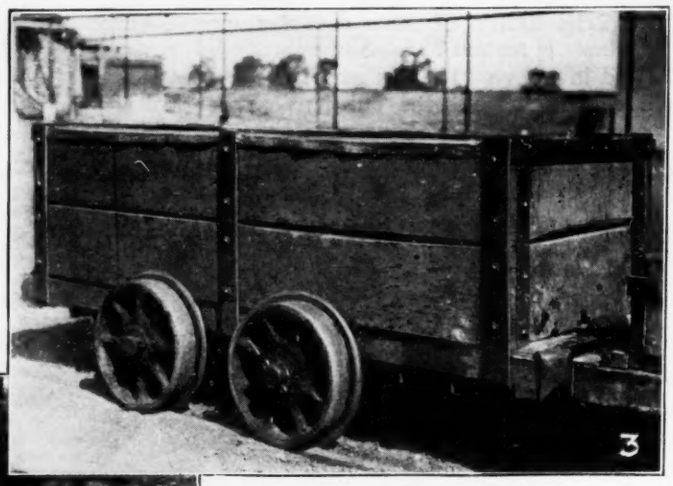
would be likely to get out of repair. The interior is lined throughout with ¼-in. fiber plate, a material possessing fireproof qualities. The body or box is 9 x 3 x 2½-ft. in dimensions and affords ample space for thirty-four boxes of permissible explosive, weighing 25 lb. each.

No miner is permitted to carry explosives with him. Instead he notifies the mine manager when he is in need of them and they are delivered for him at his working place ready for use the following day. A special force of men is detailed to the sole work of transporting explosives. This is accomplished at night when the plant is shut down and the power is off. The car is hauled from working place to working place by mules. The boxes are placed in each room, being laid near the neck but on the opposite side to that which is used in general by the machine men in paying out their cable. In this manner explosives are handled with the greatest possible care. They should never be handled in any other way. This scheme is well adapted to mines where coal-dust hazard is unusually severe.

FIG. 3.

Car for Sand

Here a cheap car replaces an expensive one. Being built without flared sides it takes up less room in the roadway and having no end gate it does not leak sand. As it is used for no other purpose than hauling sand the contents are kept free from contamination.



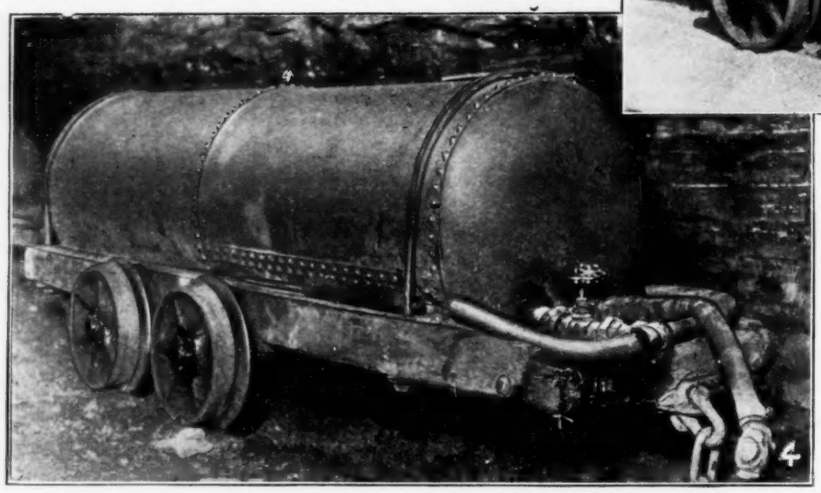


FIG. 4.

Sprinkler

This car is merely a tank on a wheeled platform. When water is allowed to run into it under pressure the air is forced into smaller and smaller compass till its pressure approximates that of the inflowing water. This air pressure supplies the force needed for sprinkling.

With Hay Car Risk of Fire Is Avoided

In Fig. 2 is illustrated what might be called a "hay" car. As is the custom in many mines where mule haulage is still in use, barns are constructed underground so that the animals do not have to be brought to the surface. The pit is no place for a sick mule, and it behooves the officials to exercise the utmost vigilance in the feeding and watering of their stock. It is possible to obtain fresh water within these barns by a pipe line direct from the surface, but the fodder cannot be transported so easily. The problem of procuring fresh, clean and sweet hay is more often solved in a careless, line-of-least-resistance manner than otherwise, as is often attested by the bad disposition of the animals.

In the mines of the Saline County Coal Co. a covered steel car is used which admirably serves the purpose of delivering dry fodder in the best of condition. Except for a hinged double door in one end the car box is solid. Both top and sides are constructed of ¼-in. steel plate. Hay and straw are placed in the car in bales. About 640 lb. can be accommodated in this manner with a single loading. When it is desired to transport oats or corn from the surface to the underground stable the grain is placed in boxes before being loaded. The utilization of a car of this type guarantees the mules against subsistence on gritty, mouldy or evil-smelling forage and grain.

A sand car is shown in Fig. 3. Sand can be delivered to the bottom of a shaft mine through a borehole from the surface, but where that cannot be done the coal car still stands handy to the drier and is apt to be used for the purpose, but, though any car can be picked up at random, it has the disadvantage that the sand is certain to be mixed with many foreign substances if loaded into a car that has just been used for hauling coal. Moreover, most mine cars are not by any means tight containers for anything so elusive as sand. Little time need be consumed in building a special car for this material. The one here illustrated is constructed of rough lumber and lined with galvanized sheet iron. Strap-iron braces may be used to give the body more rigidity. The metal lining permits of greater ease in cleaning the bottom and also allows more material to be utilized from a single loading.

Sand for the locomotives at this company's mines is screened as well as dried on the surface. It is then loaded into this car and taken down the shaft. The filled car is placed on a siding at the bottom, where its contents are accessible to passing locomotives. When the car is emptied it is removed to the surface to be reloaded.

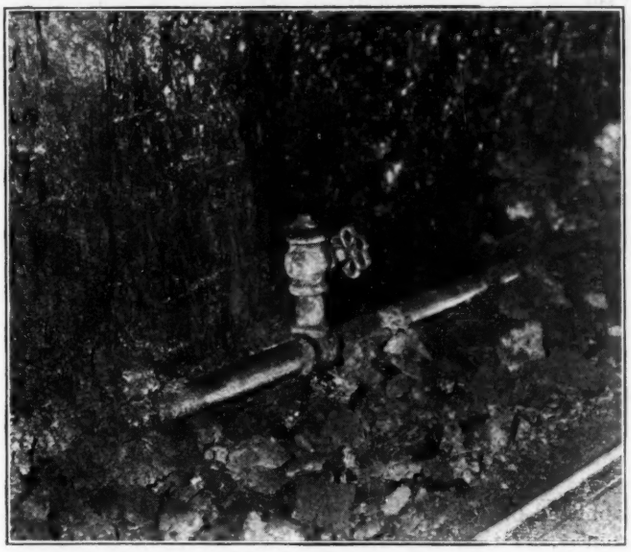


FIG. 5. TEE CONNECTION FOR SPRINKLER

Mine water is run in 2-in. pipes along every working roadway and at tee connections the sprinkler is able to get its supply of water without unnecessary travel. As the sprinkling has to be done as frequently as every other night it is important to lessen the time when the idle sprinkler is traveling to a point where it may receive its water supply.

The accompanying illustration of a tank car (Fig. 4) shows a type of rolling stock that is more or less local in its adaptation. The Illinois mines must be safeguarded against possible dust explosions arising from their extreme dryness, which is more marked than in operations in other fields. Consequently it is necessary to employ a car that will hold water and can be effectively used in sprinkling the floors of the entries.

The elimination of the possibility of a dust explosion is a problem that demands perseverance rather than a display of engineering genius. The Illinois operators endeavor to keep the floors of their mines damp at all times. Any dust that collects on the roof or the rib is washed down at regular intervals by a hose. Furthermore, the air in passing over the dampened roadways will, during the summer months, absorb the water from the floor and dampen to some extent the dust on the rib.

This type of tank car is of the simplest construction, being in the main nothing more than a steel cylinder or shell, 8 ft. long and 3 ft. in diameter, mounted on a heavy timber frame. Two strap-iron hoops hold the tank securely to the bed. The forward part of the cylinder is fitted with a short 2-in. pipe connecting with the interior.

Tee connections in this pipe permit of the tank being filled and emptied through this single opening. Two ordinary valves are attached to the stem leaving the tank. One controls the outlet to the sprinkling device and the other controls the inlet to the tank through the rubber hose. When it is desired to fill the tank this valve is opened and the other closed. With a reverse manipulation of the valves the pressure in the tank when full or nearly full forces the water through a 1½-in. perforated pipe bent in the form of a semicircle around the end of the truck frame.

A 2-in. water pipe traverses every roadway in No. 6 mine. At regular intervals along this line a tee connection is fitted so that the tank may be quickly refilled near the spot where it becomes empty. In the event of a mine fire these plugs or water stations could be used for a hose connection and any part of the mine reached with a comparatively short length of hose.

The water is delivered down the shaft to these feed lines in a 2½-in. pipe. This main pipe reaches from a tank 11 ft. in diameter and 12 ft. high placed near the power house. The shaft is 340 ft. deep, so that the water in the feed lines in the entries is actually under pressure from a head of about 360 ft. Mine water is used in spraying the roadway. This is collected at a sump underground and voided to the tank on the surface. In case of emergency it is possible to connect the water lines direct to the pump underground, when a greater pressure could be realized. For ordinary purposes, however, the head of 360 ft. suffices.

The main entries of the mine are sprinkled every other night, a mule furnishing the motive power for the movement of the car. The reason that a mule is used is that the natural gait of this animal is such as to allow the water to pass out of the perforated pipe at the correct rate of flow. There does not appear to be anything complex about this method of combating possible dust explosions. The system in a nutshell is to keep the mine wet. Yet, though this is simple, there is no question but that it is efficient if regularly practiced.

Before these tank cars were utilized in the No. 6 mine it was known as one of the most dangerous operations in the state, one where dust explosions had taken their toll of lives on more than one occasion. Today, however, it is ranked by state authorities just as high on the opposite side of the scale.

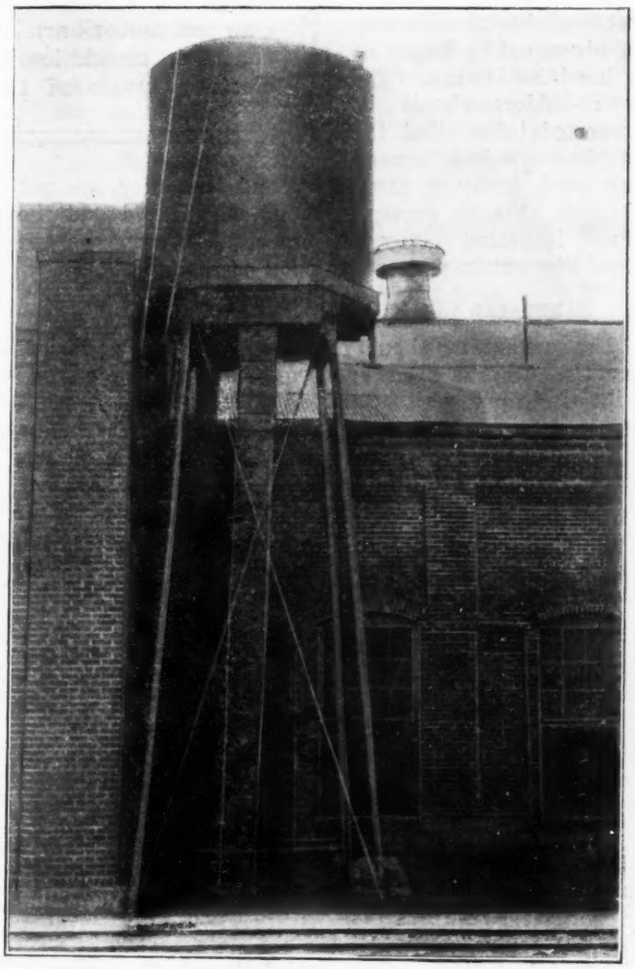


FIG. 6. TANK FOR HOLDING SPRINKLER WATER

As the shaft is 340 ft. deep and this tank is 20 ft. high the head on the sprinkler line is 360 ft, or 156 lb. The sprinkler accordingly fills quickly and discharges under good pressure.

Methods That Will Make Electrical Parts of Mine Locomotives Run Efficiently

A Discussion of the Possibilities of Failure in the Motors, Resistors, Storage-Batteries and Trolley Arms of Mine Locomotives and the Proper Steps To Be Taken to Circumvent Them and Cure Such Defects as Appear

By W. A. Clark*
East Pittsburgh, Pa.

TO OBTAIN the maximum service from the electrical parts of a mine locomotive and to prolong its life its care cannot be neglected. Some of the matters that should have careful attention will form the subject of this article. A thorough inspection should be given to the motors of a mine locomotive once every week and at the same time the cover of the commutator should be removed and the brush holders and windings cleaned. This is most easily done by blowing out the dirt with dry compressed air, or, if this is not available, the dirt may be blown out by means of a hand bellows. The brush-holders should be inspected to see that the brushes are long enough and work freely in the holder and that they are not chipped. Spring pressure should be checked and the shunt inspected. Any brushes not in proper shape should be put in proper condition or replaced.

Mine locomotives unless kept in prime condition do not give maximum tractive effort and run prematurely into old age. Given the necessary inspection, care and repair, they will have a long and useful life. This article shows the manager, superintendent, electrician and motor-barn boss what it is essential that they should know about the care of the electrical parts of the traction equipment.

Sandpaper Commutator if Black or Rough

The commutator should have a brown, highly polished surface. If it is black and rough it should be cleaned with sandpaper, which can readily be applied by means of a flat block of wood. Remove the brushes from the motor and apply the sandpaper, turning the armature slowly by running the locomotive at low speed under the action of the other motor, with the controller in the parallel position.

Care should be taken not to touch the brush-holders, as they are alive.

In case this does not clean the commutator satisfactorily, the armature should be removed and the commutator turned up. The commutator on a modern motor should not require frequent attention if the proper brushes are used and the bearings are kept in good condition. If an old motor develops commutator trouble, undercutting will sometimes overcome the difficulty.

Motor armature bearings are of several kinds. The oldest motors were fitted with babbitted sleeve bearings, grease being used for lubrication. Modern machines use bronze sleeve bearings with oil and waste lubrication, or ball bearings. Babbitted sleeve bearings with grease lubrication are not satisfactory. They require frequent attention and have a short life.

A number of operators have found it advisable to replace these bearings with bronze sleeves or to substitute ball bearings on the pinion end. When using babbitted bearings the air gap should be measured frequently, so that the bearings may be changed before there is danger of the armature rubbing on the pole pieces. On motors with sleeve bearings using oil and waste lubrication the waste should be inspected weekly to see that it is saturated with oil and is packed down in contact with the bearing. (See Fig. 3.) If the waste gets dirty or glazed, so that it does not carry the oil satisfactorily, the bearing should be repacked. However, it should not be necessary to repack it more frequently than once a year, but if the motor is overhauled for any reason it is well to repack the bearings before putting them back into service.

In packing the bearings long-fiber wool waste should be employed. This should be soaked in oil for twenty-four hours and the excess oil drained off for twelve hours before it is placed in the housing. The amount of lubricant required and the frequency of oiling should be determined according to conditions. It is the tendency of most motormen to oil too frequently, and use too much oil. This is wasteful. It also is detrimental to the motors, as the excess oil is likely to work to the interior of the motor case and get on the commutator or coils and cause grounds or short circuits.

Motors provided with ball bearings do not require attention every week. They are arranged for either oil or grease lubrication. Whatever lubricant is used it should be neutral, that is, without acid or alkali reaction, as both acid and alkali have a deleterious effect on the ball bearings.

All Parts of Controller Need Attention

The axle bearings usually are of the oil-and-waste type and should be inspected as described above for oil-and-waste armature bearings. (See Fig. 3.) However, in this case the excess oil cannot get into the motor to cause trouble. All oil and grease-box lids should be kept closed, and if broken off should be replaced, as otherwise dirt will work into the bearings, causing rapid wear.

All bolts, nuts and screws used in the makeup of the controller should be kept tight, as loose fingers or seg-

*General engineer, Westinghouse Electric & Manufacturing Co.

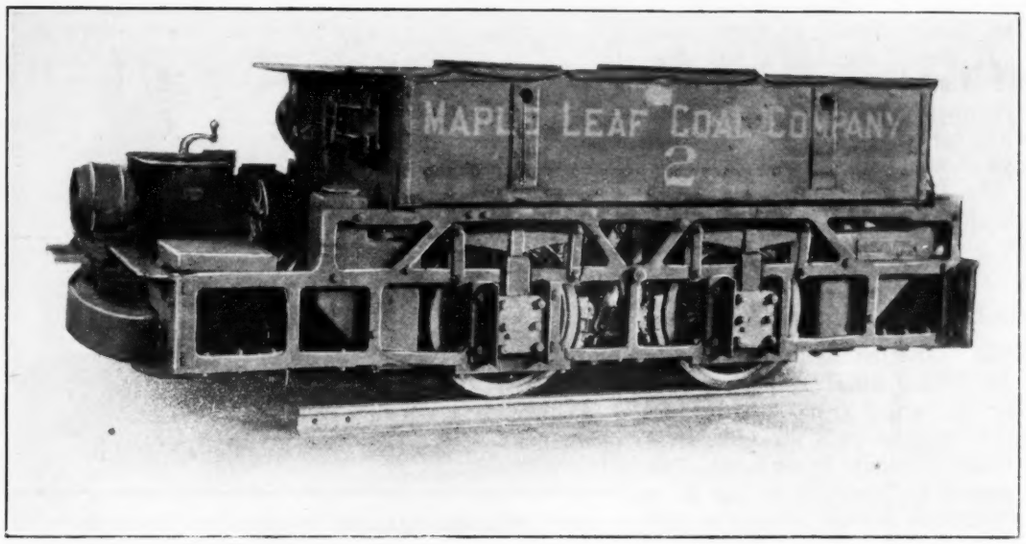


FIG. 1.

Storage-Battery Locomotive

Although the speed of the storage-battery machine is usually less than that of the trolley locomotive the same care must be exercised in its upkeep.

ments cause destructive arcing. Fingers, segments or arcing tips that become burned or badly blistered should be replaced, as operation of the controller with these parts in bad condition will cause rapid deterioration, while if the replacements are made as required the life of the controller will be extended indefinitely. Fingers and segments which do not require replacement should be dressed with a fine file or sandpaper, so as to make a full and smooth contact.

The pressure of the fingers on the segment should be adjusted. Arc-guard barrier plates should be replaced as soon as they become badly burned. If they have iron embedded in them they should be replaced before the iron becomes exposed. The inside of the controller should be kept clean of copper dust and other dirt. The drum shaft bearing, star wheel and pawls should be oiled once a day, using a drop of oil in each place.

In operating the controller the handle should never be stopped between notches. In accelerating, the handle of the controller should be moved deliberately and steadily, stopping on each notch just long enough for the locomotive to pick up speed. Dropping back a notch at a time has a tendency to burn the fingers and segments and should be avoided.

However, operating conditions at times may make it desirable to follow this procedure. Where a series and parallel controller is used, starting with the controller in the series position will greatly reduce the peak loads, and where energy is purchased on a power-demand basis, this method will have an appreciable effect on the power bill.

Resistors should be inspected weekly, to see whether there are any broken grids, loose grids or loose terminal contacts. Broken grids should be renewed at once, care being taken not to injure the insulation in making the replacement. All bolts should be kept tight. Dust should not be allowed to accumulate on the resistor or on the locomotive around it, as there is danger of dirt grounding or short-circuiting the conductors.

Blow Dust from Circuit Breaker Regularly

If there is a circuit breaker on the locomotive, its contacts should be kept smooth and clean. The breaker should be operated occasionally, so as to keep it in easy

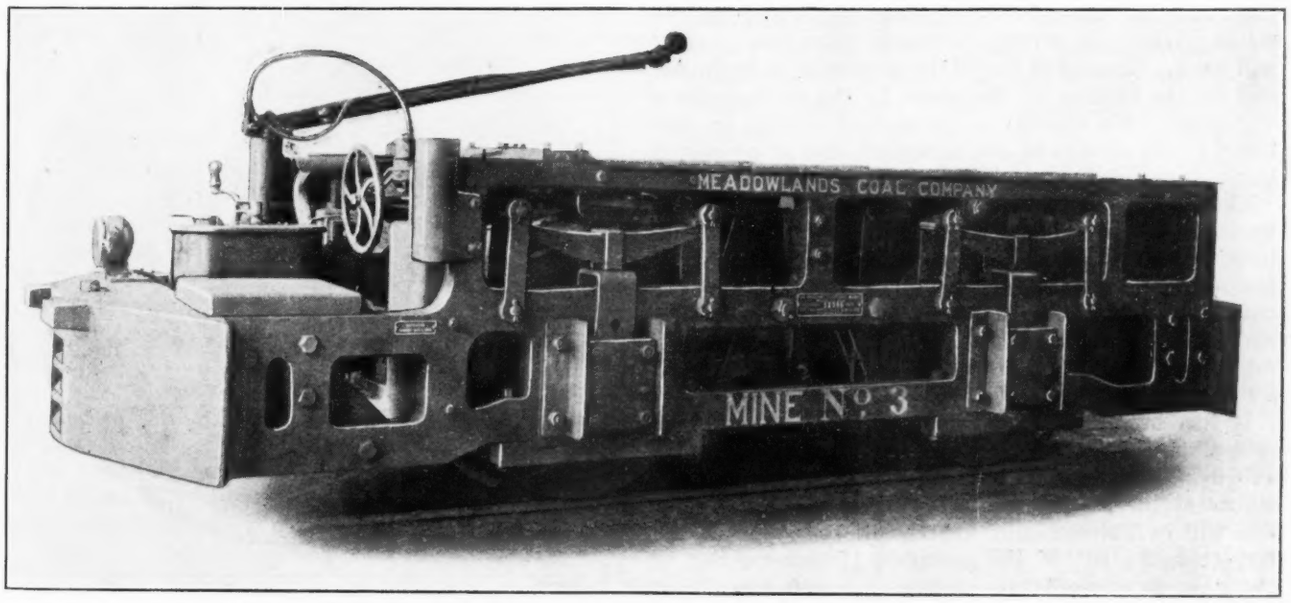


FIG. 2. AN OUTSIDE-FRAME FOUR-DRIVER MINE LOCOMOTIVE
Brake shoes and adjustment mechanism are readily accessible through the bars of the frame.

working condition. The device should be kept clean and free from dust. It should be blown out frequently, because if dust is allowed to accumulate, the device is apt to hang fire when it opens. This is likely to destroy the breaker and other parts.

A suitable fuse always should be employed to afford adequate protection to the electrical equipment. The vent in the fuse box should be kept open at all times, as otherwise there is danger of the box being destroyed when the fuse blows.

Oil Trolley Spindles; Tape Exposed Cable

Trolley poles should be inspected daily and a few drops of oil put on the trolley-wheel spindle. This will assist in preventing the wheel from jumping off the trolley wire. If when running on a straight, level track the wheel sparks badly, it should be replaced. The bushing in the wheel should be renewed before it is worn through and the terminal screws always should be kept tight.

The cable should be inspected for bare spots and these should be taped immediately, as otherwise there is danger of the operator receiving a shock in handling the trolley pole. If the cable is kept thoroughly insulated, there is no danger to the operator from this source. It will be found advisable to keep a complete pole assembled with head and wheel, as this will save considerable time in replacement in case a pole is broken.

Excessive Battery Discharge Undesirable

Instructions furnished with a storage-battery locomotive should be closely followed. The essential points to be remembered with a lead battery are that discharge should be stopped when the ampere-hour meter indicates that normal capacity has been taken from the accumulator. The battery should be changed promptly after it has been discharged. In charging it is necessary to pass through the battery as many ampere hours of current as have been drawn out, plus an excess to make up for unavoidable losses.

The ampere-hour meter is normally set to operate slow on charge in order to take care of these losses. If the charging current is maintained at the proper rate, practically all the current is useful for charging the plates. When the current is greater than this gassing will occur. Gassing is due to the formation of hydrogen and oxygen bubbles on the plates by the decomposition of water. This absorbs an amount of current proportional to the amount of gas generated, and in no case is this current useful for charging the plates.

Charging rates that produce violent gassing are wasteful of power and tend to dislodge the active material from the plates and produce an excessive rise in temperature, materially shortening the life of the accumulator. When the battery is nearly charged it is not necessary to reduce the current below the finishing rate. While this will produce some gas, it will be at a rate that will be harmless.

It has been found that if a constant potential of approximately 2.3 volts per cell at normal temperature (70 deg. Fahr.) is maintained constantly at the terminals of the battery, the charging rate will taper off and will be automatically kept below the value of the ampere hours out of the battery. If this method of charging is employed the voltage per cell should not fluctuate beyond the limits of 2.40 and 2.15 volts per cell.

FIG. 3. OIL AND WASTE LUBRICATION APPLIED TO AN ARMATURE BEARING

Such a bearing should be repacked whenever the waste becomes dirty or glazed so that it does not carry the oil well.

If the average potential is above 2.3 volts per cell, or the maximum over 2.4 volts per cell, overheating of the battery will result. If the potential falls below 2.15 volts, no charging current will be taken by the battery. If the average potential is between 2.30 and 2.15 volts per cell, the battery will charge at a reduced rate.

The battery should be given an equalizing charge at frequent intervals to keep it in good shape, and so that the ampere-hour meter will indicate properly the state of charge existing. Pure water should be added to the electrolyte as required to maintain this liquid at the proper height. Electrolyte as such should never be added.

As in the case of the lead battery, only pure water should be added to an Edison or alkaline accumulator to maintain the electrolyte level. In re-energizing an Edison battery, the charging current always should be at or above the normal charging rate. If charged below

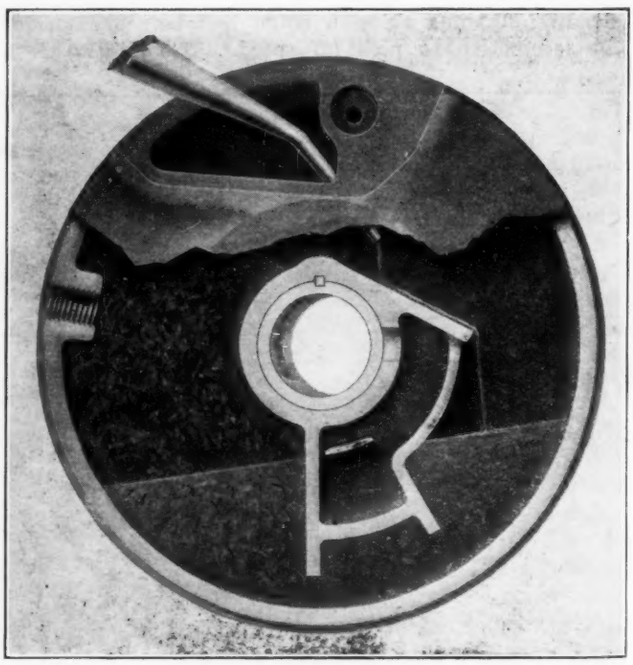


FIG. 4. WASTE-PACKED MOTOR COVER BOX

The oil level always may be readily seen by lifting the cover of the packing compartment.

the normal rate, while the ampere-hour meter may indicate complete charge, the battery will actually not be in this state, and the locomotive will operate sluggishly. The speed and mileage on the following discharge thus will be reduced.

The battery may be charged at rates considerably above the normal rate, provided the temperature of the solution in the cells does not exceed 115 deg. Fahr. The gassing, which results from a heavy current, does not have the harmful effect that it does on a lead battery. After the day's run it is advisable to remove the cover of the battery compartment and allow the battery to cool before starting to charge it; otherwise there is danger on charge of overheating the battery and, in consequence, shortening its life.

Repair Breaks in Cable Covering Smoothly

The conductor-cable reel, if this is part of the locomotive equipment, should be inspected daily. All worn places in the cable insulation should be promptly taped. When the cable breaks or is cut so that it is necessary to repair it, care should be taken to make a good and compact splice such as will not increase the size of the cable at that point, thus avoiding any tendency of the cable to drag on the guide insulator. If the reel is mechanically operated, the clutch and other parts of the mechanism should be carefully inspected to see that they are not likely to fail.

On a motor-operated reel the motor should be given the same attention as the main driving motors. The brushes should be inspected and the parts cleaned every week. The bearings should be oiled about twice a week, using only a small amount of lubricant.

If a traction or crab reel is employed, the various parts of this device should be given the same sort of inspection and care as is bestowed upon the corresponding parts of the locomotive and motor equipment.

The principal electrical troubles experienced on mine locomotives are open circuits, short circuits and grounds. If the circuit is open in the wiring, in the resistors, or in the motor field circuit, the locomotive will not start.

If the open circuit is in the resistor, the locomotive will start with a jerk as soon as the controller is thrown past the point affected. If the open circuit is in a motor field, the machine will not start in the series position of the controller, but will start in the parallel position. In this case the open circuit can be located in the motor affected by removing the brushes from first one and then the other, and operating the locomotive with the controller in the parallel position.

If the open circuit is in an armature coil, the locomotive will run, but there will be bad sparking on the commutator and it will tend to have a jerking, or non-uniform, rotation. An inspection of the commutator will readily show an open circuited armature coil, as the commutator segments between which the open circuit occurs will be blackened and slightly burned. If the open circuit is not corrected promptly, it may cause a flat spot on the commutator, which will necessitate its being turned up. Temporary relief can be obtained by putting a jumper across the open-circuited bars of the commutator. This, however, is only a makeshift expedient and should be replaced by proper repairs at the first opportunity.

A short-circuited armature coil will not be very noticeable, but it will cause local heating, that is, heating of the coil itself. This coil will burn out in time, and may even get hot enough to burn out the adjacent coils. If the condition of the coil is detected before it has burned out, temporary repairs may be made by open circuiting the coil and putting a jumper across the proper commutator bars.

Repairs can be made only by rewinding the armature. It may be possible to put one new coil in the armature, or possibly two or three, but if the coil which is short-circulated is not detected for some time it is probable that most of the armature coils will have been heated to such an extent that it will be necessary to rewind the armature completely.

A short circuit in a field coil will cause a higher speed of rotation, and if any turns are short circuited it is likely to cause flashing. In any case, because of the tendency toward higher speed, the motor so affected will take more than its share of the load when the motors are operated in parallel. The armature is, therefore, likely to burn out.

The field coil in which there is a short circuit probably will run slightly cooler than the other coils because of its lower resistance. It may sometimes be located by its lower temperature. A short circuit in a commutating field coil will have no effect except to cause sparking, while an open circuit in a commutating field coil will prevent the motor from operating. Trouble with the commutating coils, however, is likely to develop.

On a trolley locomotive operating with ground return, a ground on the resistor will cause the fuse to blow or the circuit breaker to open. A ground on a motor also will have similar results as soon as the resistance steps are cut out. If a ground occurs on the motor on the ground side when the motors are in series, the fuse may not blow as long as the motors are thus operated, but will blow as soon as they are placed in the parallel position.

If the locomotive is operated on an undergrounded circuit, or, in the case of a storage-battery machine, where neither side of the battery is grounded, a single ground anywhere on the electrical equipment will not cause trouble, but a second ground will cause a short circuit between the two grounds. If this short circuit is inside the battery, it will cause the section of the battery between the grounds to discharge, and therefore shorten the life of the accumulator. If, after the locomotive is rewired, it is found that it starts properly but accelerates suddenly on a certain notch of the controller, the connection between the controller and the resistor should be gone over carefully to discover which leads are crossed. If both motors will operate in one direction of rotation, and only one in the opposite direction, a field and armature lead have been interchanged on that motor, which fails to operate in both directions.

Where Some Coal Cars Were Last Month

ON SUNDAY, July 11, there were observed on the Baltimore & Ohio near Baltimore three coal cars containing Ford automobiles destined for Manchester, England, that had been carded at Detroit on May 25 and June 3 and 4. Also one car containing Buicks destined for Stockholm, Sweden, that had left the factory at Flint, Mich., on May 25. Two cars of pipe adorned the siding, having been shipped from Mansfield, Ohio, on May 21, and one car of skelp from Chicago, also for export, billed on May 10. These cars overstayed their welcome on the siding near Baltimore and were later pushed back, probably by congestion in Baltimore yards, to a siding near Washington, D. C.

Method of Dumping Rock Lightens Labor And Meets Labor Shortage

A Simple Device That Can Be Built at Any Mine Shop When Used in Conjunction with a Small Hoisting Engine Releases Eight Men to Other Employment

By Dever C. Ashmead
Wilkes-Barre, Pa.

DURING the last few years, or since the beginning of the World War, there has been no increase in labor from immigration. On the other hand there probably has been a slight decrease. This condition has caused a shortage in labor and has tended to decrease output in all lines. This decrease in the labor supply has made those interested in the production of raw and manufactured materials study various methods whereby output per man can be increased, with, if possible, a decrease in cost.

Probably in no locality has this decrease in the available amount of labor been felt as intensely as in the anthracite coal region. The sons of the present miners are leaving the industry and replacement must come from immigration, which at this time is not merely a negligible but is actually a minus quantity. This causes a serious shortage in man-power at the mines, which must be offset or counteracted by labor-saving machines or devices that will decrease the number of men required to do any certain piece of work.

As a result of a study of ways and means for decreasing labor expense the Philadelphia & Reading Coal & Iron Co. of Pottsville, Pa., has perfected an improved method of handling mine rock on the dump. This has been thoroughly tried out at the Silver Creek Colliery of this company. It is, however, adaptable to the rock dump at practically any mine, whether that dump is on level ground or on a mountain side.

As the dump at the Silver Creek Colliery is on a side hill the procedure there followed will be first described and later on it will be shown how the same general scheme can be adapted to any condition. Two separate sets of tracks are employed. The first of these is for the mine cars while the other set is for the dump carriage. For accommodating the mine cars there is a loaded and an empty track. These naturally have the same gage as the mine tracks, which in this case is 4 ft. The mine locomotive places the rock cars on the loaded track, which has a grade of about 2 per cent in favor of the loads.

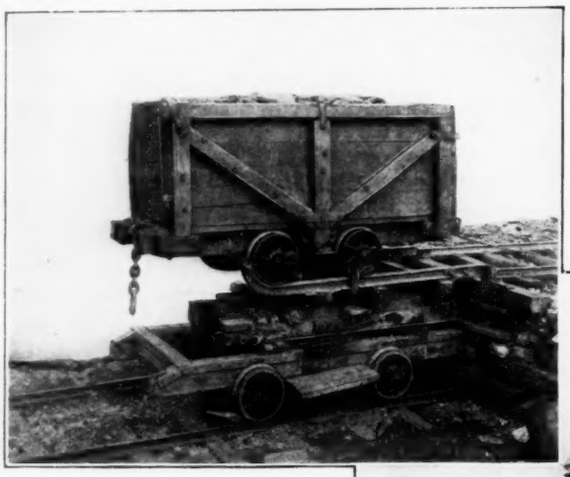


FIG. 1

Loading Car on Truck

Careful inspection will show the iron guide against the side of which the rail on the truck rubs. There is one on each side and between them they keep the truck rail in perfect alignment with the main track. Note the clevis on the rear wheel holding the car down to the rail of the revolving dump.

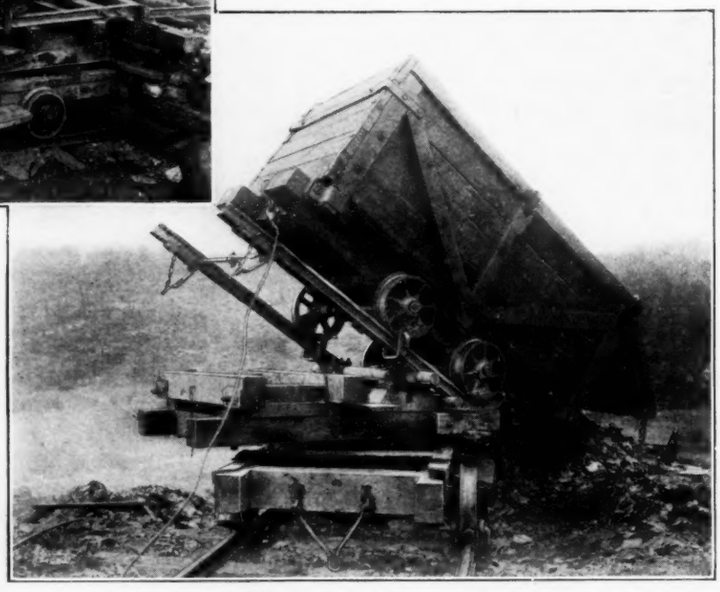


FIG. 2

Dumping Obliquely

Note clevises on the rear wheels of both car and truck. Thus shackled only the loose slate can pitch headlong over the dump edge. As the slate is dumped well away from the track with appreciable force and in any direction desired, a wide and permanent fill is made that does not need much trimming.

From this point the cars are dropped by gravity to either of the loading docks, or "bumping blocks," as they are locally called. The car is then run, gravity assisting, onto the dumping carriage. The empty tracks have a grade from the docks to a point beyond the switch which unites them of 2 per cent against the empties. The grade then changes until it is in their favor and permits them to gravitate toward the mine.

A 5-ft. gage is used for the dump carriage, the tracks for which are placed a sufficient distance below those for the mine cars so that the rails on the top of the carriage form a continuation of the loaded tracks. Rock cars may, therefore, be run onto or off of the carriage with ease.

Truck Surmounted by a Revolving Dump

Owing to its simplicity the dump carriage can be built at almost any mine shop. It is constructed almost entirely of wood and is reinforced with iron at the necessary wearing points. The bottom portion, or bed, is a rectangular crossbraced frame composed of 6 x 9 in. timbers. On top of this bedframe is placed a turntable 4 ft. 2 in. in diameter. This is made of steel 1 in. thick and 3 in. wide. Resting upon this turntable is the upper or movable part of the dump carriage. This is constructed of timber of the same size as the lower portion, or bed. Where this upper frame comes in contact with the turntable it is faced with steel plates.

Mounted upon the timbers and directly over the center of the turntable is a round steel axle. This is turned down at its ends, where it fits into pillow blocks. To this axle is fastened the rails that support the mine car and act as the dump proper. The forward end of each rail is bent in the form of a horn similar to those commonly used on the old-fashioned mine dump. The arrangement is such that when the mine car is in place on the carriage it will be slightly off center so that when release is made the car will tilt by gravity. In order to prevent the dump from operating prematurely two catches are provided to hold the mechanism horizontal until they are released for dumping.

For the operation of the dump a small hoist of some sort is necessary. At this mine a small Flory steam hoisting engine is used. The steam cylinders are each 6 x 8 in. and the drum has a capacity for 350 ft. of ⅝-in. rope.

Rope Attached to Mine Car, Not to Carriage

Before the loaded car is run on the dump carriage the end of the hoisting rope is attached to it. It is then allowed to run down the grade and onto the dumping carriage, to which it is fastened by means of two clevises which encircle the rails on the latter and the pins of which pass through the two rear wheels of the car. The carriage is then dropped down the grade by gravity to the dumping point.

A similar pair of clevises is here applied to the rear wheels of the carriage, fastening them to the main track. The first set of clevises prevent the car of rock from jumping off the carriage while dumping or from being pulled off the carriage by the rope while going away from, or returning to, the loading dock. The second set is to prevent the carriage from being thrown off the track or over the dump because of the sudden jar when the car tilts and discharges.

If it is desired to dump the car over the front end of the carriage all that is necessary is to release the catches which hold the car in place. The car, being beyond the center of gravity of the dump, then automatically tilts itself. If, however, it is desired to discharge the car to one side of the dumping carriage it is necessary when the desired point is reached to release the rope from the mine car and fasten it to either of two hooks at the forward corners of the swiveling frame. Which hook is used depends on which side of the carriage the car is to be dumped. After attaching the rope the hoisting engine is started and the upper part of the carriage with the car is turned to the desired position. The rope is then unhooked and reattached to the rock car, the catches released and the car dumped as in the first case.

After the car has been discharged it is not necessary

FIG. 3.

Layout of Tracks Above Dump Docks

On the left an empty car has just been pulled back from the dump and is approaching the dock, but without as yet being righted. At the other dock is a car loaded with slate which has been run forward onto the truck but has not yet been attached to the hoisting rope. These big cars hold three tons of coal and a much greater weight of rock. House protects dump hoist.

to right it. The clevises holding the carriage to the track are released and the hoisting engine is started. As the rope is attached to the mine car and it, we will assume, is standing at an angle to carriage the swiveling frame will first be revolved to its proper position. As soon as this is accomplished the rope draws the dumping carriage back to the loading dock. While the carriage is thus returning the clevises that fasten the car to it are loosened.

When the dumping carriage cannot go any further the rope tends to pull the mine car off the carriage and the car rights itself, simultaneously bringing the track on the swiveling frame in line with that on the loading dock. This alignment is assured by two guides that force the rails to come exactly into place. After the mine car has resumed its normal position on the carriage it is pulled off and up the empty track past a knuckle. Here the rope is removed, to be attached to the next load of rock.

The actual time consumed in discharging a load of rock from the time the loaded car is placed on the dumping carriage until it is taken off again is much less than is necessary to read the description of the process here given. Without allowing the men operating the rock dump to know that they were being timed it was found that it took exactly one minute and ten seconds to complete the operation.

Four men are required to operate the dump at this mine—one manipulates the hoisting engine, another uncouples the cars and attaches the hoisting rope, again coupling up when the dumping is finished, while two men are required on the dump carriage itself. When dumping is slack these men take care of the track, keep it clean and lay new track as it is required.

The installation of this system released eight men to other employment, since the dump as formerly operated required twelve men for its manipulation. Where the amount of rock to be handled is not as large as at this mine it might be possible to reduce the operating force to as few as two men.

This system of dumping is extremely elastic, as it permits the rock to be discharged at any angle to the track, for the carriage may be rotated 270 deg. The high angle at which the car can be tilted (45 deg.) insures that practically everything slides out and no shoveling is required. At this mine eighty 3-ton cars of rock are normally handled in a day. As high at 115 cars have been discharged in the same period without inconvenience.

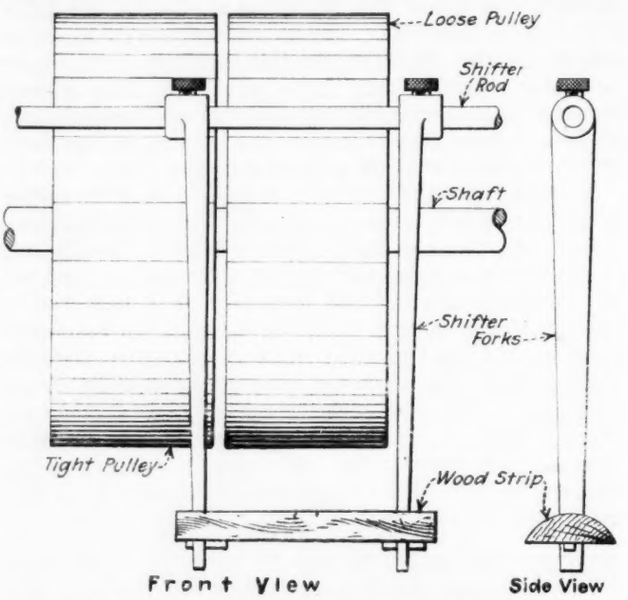
Variations of this system readily can be worked out. Thus if sufficient height is not available for a gravity dump pile the system can be reversed. Instead of letting the cars gravitate to the dumping point and hauling them back when empty a trestle could be built with the grade against the loaded carriage. It could be hauled up this grade by the hoisting engine and dropped back to the bottom by gravity after discharge. The only difference in the mechanical equipment required would be a sheave wheel located beyond the dumping point for the hoisting rope to pass around, for it would have to be fastened to the opposite, or forward, end of the mine car.

This type of dumping carriage has been used for many years, especially in the central Pennsylvania field. Its use with a hoisting rope materially adds to the speed of dumping and lightens labor. Where the heavy carriage and well-laden cars have to be pushed by man power on the uneven surface of an unequally and ever-settling rock dump the work is quite severe for the men who have to propel it unless the grade is in general so steep that the carriage with its load is at times disposed to run away. No small amount of inconvenience is suffered should such a runaway occur. Both carriage and car are apt to be seriously damaged; both have to be laboriously hauled around to the mine mouth and for a while another carriage has to be used or dumping plans of the simpler sort have to be followed till the work described is done. The rope is a safeguard against any such inauspicious happening.

Keeping the Belt in the Shifter Forks*

BY L. G. SINGER
St. Louis, Mo.

FREQUENTLY when a belt is shifted suddenly it jumps out of its proper position between the shifter forks. This also may happen when the belt is loose or the shifter forks are too short. Such occurrences can be prevented by fixing (after the belt is in position) a wood



THE BELT-RETAINING CROSS BAR IN PLACE

strip across the lower ends of the forks, as shown in the accompanying illustration. The strip can be held in place with spring cotters, set in drilled holes as suggested, or by means of pieces of wire suitably bent.

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Doughnut Picking Table at Stockett, Mont.

ON PAGE 806 of the April 22 issue, mention is made of a doughnut picking table at Nanty Glo, Pa. I would like to call your attention to the fact that the C. O. Bartlett & Snow Co. built a similar picking table for the Cottonwood Coal Co. at Stockett, Mont., which was installed in 1913, and has been in continuous operation since that date.

The general scheme was conceived by F. C. Greene, a mining engineer, who lived in Cleveland, the Bartlett & Snow Company working out the details and building the equipment. Mr. Gertz, who calls attention to these facts, is of the impression that the idea was not an original idea of Mr. Greene, but something similar to a design he had seen in his travels abroad.

At What Height Above the Grate Should A Return Tubular Boiler Be Set?*

In Order to Secure the Best Results with Bituminous Coal the Boiler Shell Should Be Set as Near the Fire as Possible and Yet Provide Ample Room for the Gases—When Boiler Is Near the Grate It Prevents High-Temperature Distillation with Its Evolution of Heavy Hydrocarbons

BY HENRY MISOSTOW†
Chicago, Ill.

A BOILER does well or ill as the combined result of the many factors which enter into its operation. Successful performance cannot be wholly claimed for, or attributed to, the height of the boiler setting. In fact, if any one factor should be given credit, it should be the men who operate the boiler—the engineer and fireman.

However, the height of the setting is quite important and worthy of careful consideration. To determine the best distance from the shell of the boiler to the grate try to visualize the factors and conditions in practice which determine this distance. As far as possible, the designer of the setting should provide such a distance from the shell of the boiler to the grate as will make it possible to utilize the greatest possible percentage of the heat that the fuel has furnished, provided, however, that such a setting does not prevent the furnace from burning the fuel in such a manner as to secure to the gases the maximum amount possible of its potential heat. To satisfy these conditions we must set the boiler as close to the source of heat, which is the fire, as possible, while still arranging to have a furnace which, in the presence of the boiler at the predetermined distance, will allow as perfect combustion as is possible under normal operation.

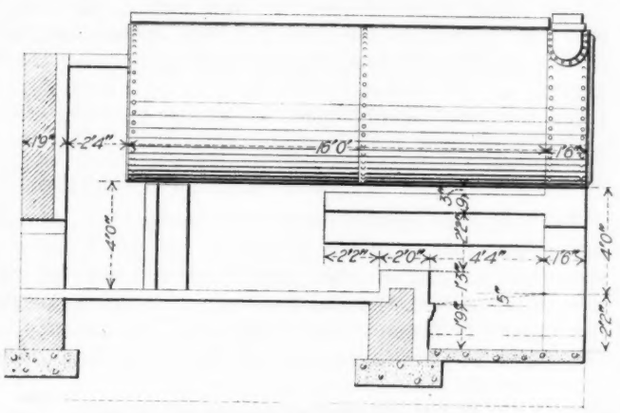

FIG. 1. RETURN-TUBULAR BOILER SETTING WITH LONG DUTCH-OVEN ARCH OVER FURNACE

The dutch-oven arch extended 26 in. beyond the bridge wall. A hot fire was what this setting contemplated. To this end it isolates as far as possible the cold shell of the boiler. The coal was subjected at once to an intense heat that drove off heavy hydrocarbon vapors which were imperfectly burned, making dense smoke for one to two minutes after each firing.

Taking for granted that the importance of draft and its utilization is fully appreciated, consider the combustion of bituminous coal. The characteristics of this coal in the process of combustion are unlike those of any other form of fuel, and yet it presents the combined characteristics of all other principal fuels, such as anthracite, coke, oil and gas.

Part of it burns on the grates, part is liberated as heavy hydrocarbons in the form of oil vapor to be broken up into gas above the fuel bed, part distills as light hydrocarbons and part appears as carbon monoxide. The monoxide and the light hydrocarbons are true gases and readily consumed. The preparatory process before actual combustion takes place, often termed distillation of the volatile, has an important bearing on the results to be obtained.

IMPORTANCE OF PROGRESSIVE COMBUSTION

The more violent the process of distillation the harder it is to obtain complete combustion. With bituminous coal there is less fixed carbon than with anthracite and there are more and heavier hydrocarbons to carry their free carbon above the fuel bed. The less violent the process, the smaller the quantity of hydrocarbons of heavy composition that will escape from the fuel. Such gases as will be evolved will be such as contain little or no free carbon. These lighter gases are easy to break up and burn. The rate of distillation, or rather, violence of distillation, is directly proportional to the temperature at which distillation occurs.

This characteristic of bituminous coal being well appreciated by most of the stoker manufacturers, each claims that his stoker is the best means to obtain

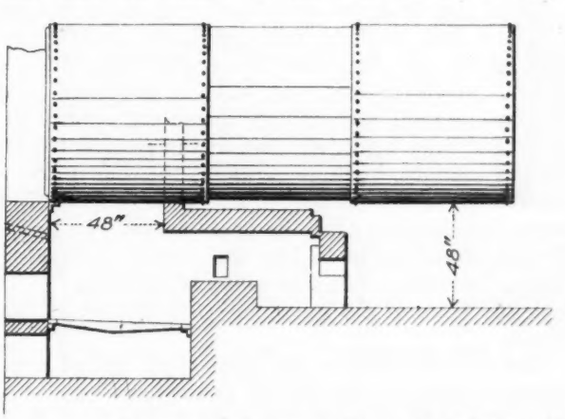

FIG. 2. DUTCH-OVEN ARCH CUT AWAY ABOVE THE FIRE AND DEFLECTION ARCH ADDED

Not content with the straight dutch-oven effect, a deflection arch was made to turn the fire downward still further from the cooling surface. It seemed, however, to improve results, probably because the tarry vapors were not consumed under the combustion arch and needed time and opportunity to burn without contact with, or proximity to, the relatively cool boiler.

*Abstracted from an article that appeared in *Power* June 29, 1920.

†Engineer, Smoke Department, City of Chicago.

progressive combustion—that is, coal is being slowly moved into the zone of high temperature, making possible slow distillation at low temperature and a high-temperature zone for burning the remaining coke or fixed carbon. So-called perfect mechanical firemen (stokers) that flip the coal into the furnace have failed in competition with stokers that make progressive com-

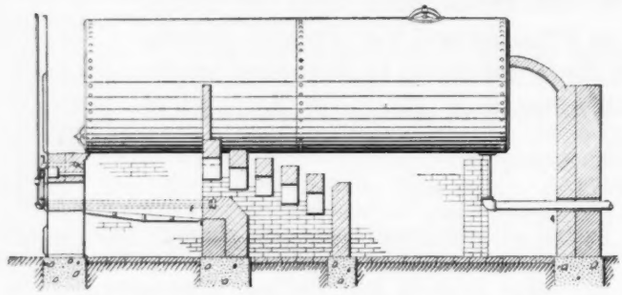

FIG. 3. ONE OF THE FANCY FURNACE DESIGNS WHICH SHOWED A SLIGHT IMPROVEMENT

With the boiler uncovered immediately over the grate the coal first receives a toasting rather than a burning heat. The gases are then directed in five streams upward toward the boiler. Just when the gases should be burned they are cooled and the resistance to their passage is surely excessive.

bustion possible because in the design of the former the importance of slow distillation at relatively low temperature was not considered.

Seeing the foregoing conclusions are correct, close proximity of the boiler is desirable, not only to obtain better absorption but also to obtain better combustion by such a reduction in the furnace temperature as will reduce the violence of distillation and thereby minimize the difficulty of handling the volatile part of the coal. The time required for distillation in practice varies from three to ten minutes, depending upon the quantity charged and the furnace temperature, but on an average in hand-fired furnaces six minutes is ample.

During combustion the air admitted is heated to the furnace temperature, and naturally its volume increases. Any restriction of this expansion would delay combustion and interfere with the mixing of air and combustible gases. For this reason ample room must be provided for the gases rising from the fuel bed.

Burning Gases Seldom Impinge on Boiler

When the firedoors are closed, the gases on leaving the fuel bed tend to rise vertically until they are affected by the force of the draft; then they bend slowly toward the exit, and, when in line with or above the bridge wall, are entirely under the control of the draft and take a straight line to the rear of the boiler. Flames seldom impinge against the boiler at right angles, but travel parallel to it. This fact clearly indicates the direction that the gases travel. In fact, they do not ascend so as to hug the curved surface of the boiler, indicating that here and a little above the bridge wall the force of the draft gets full control of the gas travel.

The chilling effect of the shell, then, cannot have any material effect on combustion, as the flames travel parallel to the shell, scarcely touching it, for there is a gas stratum, or film, that covers the boiler shell and moves at comparatively low velocity, being impeded by the roughness of the metal. Therefore the space required for combustion will be that necessary to accommodate at the furnace temperature the gases rising from the fuel bed. Combustion will be carried outward and completed in the combustion chamber without ill effect from the boiler shell. As to this matter anyone can become convinced if he observes the facts in every-day practice.

Volume of Gases Augmented by Travel

The amount of gas per pound of coal in the furnace seldom exceeds 20 lb. This is augmented by infiltration until at the stack in some cases it runs as high as 35 lb. But in considering the furnace space above the grate an allowance of 20 lb. of gas per pound of coal should be ample. With the boiler set above the fire and free to absorb heat the temperature in a hand-fired furnace seldom exceeds 1,800 deg. F.; for practical purposes, there is, say, 52 cu.ft. of gas to a pound of coal.

The maximum rate of combustion for a hand-fired furnace can be taken as 25 lb. of coal per square foot of grate per hour. Gases rising from each successive longitudinal foot of the grate, traveling toward a common point and in a straight line, are bound to amalgamate, forming one mass at or beyond the last unit area at the front face of the bridge wall.

The gases rising from the front end as they pass over the second square foot will be doubled, and the gases over the last foot of grate will be as many times greater as the distance traveled by the gases rising from the first square foot of grate, granting that all grate surface is uniformly active.

Estimation of Space Needed for Gases

The maximum rate of combustion being 25 lb. of coal per square foot of grate per hour, and 20 lb. of gas per pound of coal at 1,800 deg. F., or 52 cu.ft. of gas per pound of coal, the required height to accommodate the gases will depend on the velocity. The velocity of the gases in the furnace is at first indefinite, then

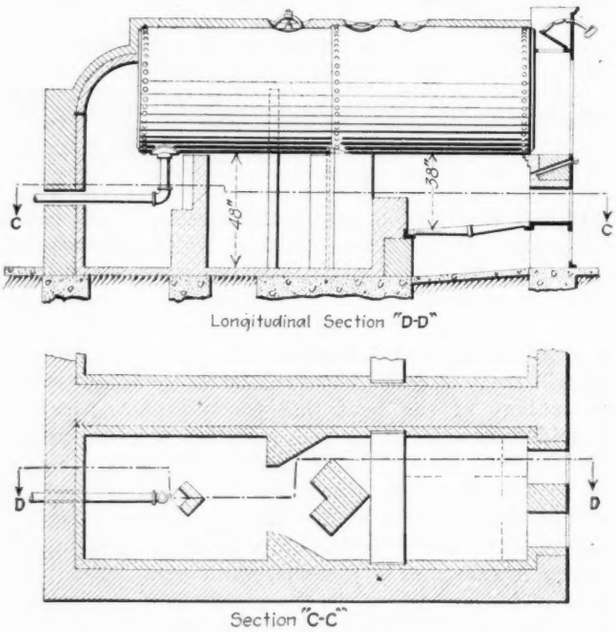

FIG. 4. FINAL DESIGN OF SETTING KNOWN IN CHICAGO AS A NO. 8 FURNACE

Here the coal is coked at a low temperature, generating gases rather than soot and tarry vapors. Nothing compels them to play on the cool boiler, so as soon as formed they burn in streams running parallel to the base of the boiler without touching it at any point. Smoky material is evolved in small quantity and whatever is made is readily consumed.

gradually accelerates as they move toward the bridge wall, and can be taken conservatively as 20 ft. per second. At the front, where the velocity is less, the gas body is smaller, so natural conditions almost compensate each other.

Allowance Necessary for Passage of Gases

The area required to allow the gases from a strip of grate 1 ft. wide and 6 ft. long to pass at a velocity of 20 ft. per second is $\frac{25 \times 20 \times 52 \times 6}{60 \times 60 \times 20} = \frac{13}{6} = 2.17$ sq.ft. As the unit width is 1 ft., the height required will be 2.17 ft., or 26 in. Taking the space requirement for the fuel bed plus the pitch of the boiler as 12 in., the required distance that the boiler must be set from the grate to provide a space for the change of direction of the gases from the vertical to the horizontal will be $26 + 12 = 38$ in.

From this it can be seen that the 38-in. setting will take care of the combustion requirements, *provided the rate of combustion does not exceed 25 lb. per square foot of grate per hour.* Where the ratio of the grate area to the heating surface of the boiler is such as not to require this rate of combustion, the distance may be reduced accordingly.

Specific Case of Increased Economy

In ordinary practice boilers should be set at a height above the dead plate not less than 0.25 of the grate length plus the height of the bridge wall. In this case, 25 per cent of the grate length is $6 \times 0.25 = 1.5$ ft., or 18 in. The bridge wall being 18 in. high, then $18 + 18 = 36$. Wherever the space is available, to this is added 2 in. to take care of the required boiler slope, making 38 in. from the dead plate to the shell of the boiler. Any variation from this may be an expensive luxury or an expensive economy.

As to the betterment in performance by reducing a 48-in. or higher setting to 38 in., it is difficult to draw a comparison, as most of the changes from higher to lower settings have been made simultaneously with other changes, such as redesign of the brickwork, and while the results obtained in each case were worth while, it would be difficult to ascertain the gain contributed by reduced height. However, I know of one case that may be of interest in more ways than one and that may help incidentally to clarify some of the hazy ideas that have been and are now being followed by some of the so-called combustion experts who persistently harp about the importance of high temperature, the chilling effect of the boiler and the disastrous results following the contact of the flame and the boiler shell.

Doubled Evaporative Capacity of Boiler

The accompanying illustrations are setting designs for the same boiler and can be considered as an index to the evolution of hand-fired furnaces for return-tubular boilers, each representing the prevailing idea at the time the change was made. Fig. 1 shows a full dutch-oven arch 9 in. thick extending 26 in. beyond the bridge wall. The arch is 8 ft. 6 in. long, and there is a 3-in. space between it and the shell of the boiler. The boiler shell is set 4 ft. above the grate at the front and 53 in. at the bridge wall.

In May, 1908, the furnace replaced a Hartford setting to prevent smoke and to improve economy. The results were not as anticipated. A boiler test showed an evaporation of only 3.84 lb. of water per pound of coal, high initial and final furnace temperatures and dense smoke after each firing for from one to two minutes. The capacity was but little over one-half of the rating. About six months later the furnace was modified as shown in Fig. 2, the significant features of modification being the addition of a doflection arch at the end of the dutch-oven arch and the exposure of the boiler shell above the fire by removing 4 ft. from the front of the dutch-oven arch.

The changes made improved the smoke condition, but not to a degree considered satisfactory. The initial and final furnace temperatures were reduced moderately. The capacity approached rating, and an evaporation test showed 4.25 lb. of water per pound of coal of the same quality as before.

Not Satisfied with Fancy Furnace

In 1914 this furnace was replaced by the fancy furnace shown in Fig. 3. A test showed an evaporation of 5.05 lb. of water per pound of coal, and the smoke condition was improved somewhat. Not being satisfied, the engineer kept on changing, and another commercial furnace was installed which showed on test an evaporation of 5.17 lb. of water per pound of coal.

During the same year, on my advice, the setting was changed from practically 53 in. from the grate to the shell at the bridge wall to 38 in. and the brickwork was redesigned, as shown in Fig. 4. A test with the same quality of coal used with the other furnaces showed an evaporation of 7.78 lb. of water per pound of coal. In a seven-day test the evaporation was 7.07 lb. of water per pound of coal. The chimney never will show dense smoke if the boiler has been properly fired.

In this case it is difficult to say how much credit for the improvement in evaporation is due to decreasing the distance from the shell of the boiler to the grate or how much is due to the brickwork rearrangement, but there is no question that it made a tangible contribution to the final results.

Working Facts About American Wire Gage*

By R. P. Beck
St. Louis, Mo.

THE abbreviation "A. W. G." means American, or Brown & Sharpe, Wire Gage. The term "American" has come into general usage because this gage is used almost universally in this country for measuring bare and insulated copper wire less than 1 in. in diameter. Facts that are convenient and easy to remember about the American, or the Brown & Sharpe, wire gage are:

Add 3 to any gage number to obtain the number of a wire having half its area; thus, $7 + 3 = 10$; and a No. 10 wire has one-half the area of a No. 7. Subtract 3 from any gage number to obtain the number of a wire having twice its area; thus, $6 - 3 = 3$; and a No. 3 wire has twice the area of a No. 6.

The ratio of the area of a wire to that of the next larger size is 1 to 1.26; to the next smaller size it is 1.26 to 1. The diameter of a No. 10 wire is practically $\frac{1}{10}$ in. and the resistance per 1,000 ft., provided the wire be of copper, is one ohm.

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Discussion by Readers

Edited by
James T. Beard

Height of Flame Cap Varies with Conditions of Testing

SPECIAL interest attaches to the question of the correct determination of the percentage of gas in air, by observing the height of flame cap produced in a safety lamp exposed to an atmosphere charged with gas. As mentioned in a letter on this subject that appeared recently in *Coal Age* [May 27, p. 1107], there is considerable difference in the height of flame cap, as given in different textbooks, for a given percentage of gas.

Attention has frequently been drawn to the fact that the height of the cap, for any given percentage of gas, will vary with the following conditions: 1. The kind of lamp used in testing. 2. The illuminant burned in the lamp. 3. The conditions under which the test is

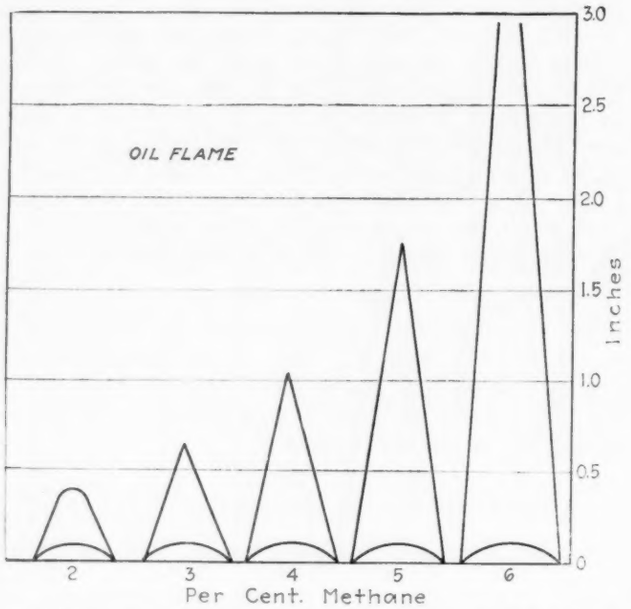


FIG. 1. SHOWING GAS CAPS WITH 3 MM. OIL FLAME

made. However, in the use of any type of lamp, the factor that has the greatest influence on the height of cap produced in a given mixture of air and methane is the heat of the testing flame.

It is, of course, true that all observers are not alike able to accurately gage the height of the non-luminous cap, owing to inequalities of eyesight. Moreover, the manner in which the gas-charged air is brought in contact with the testing flame, as well as the accuracy of determining, later, the actual percentage of gas in the air tested, greatly modify the results.

Probably no experiments to ascertain the correct height of safety-lamp flame caps were ever conducted with more accuracy and patience than were those made at my suggestion, by Professor Frank Clowes, who was then principal of the University College at Nottingham, England. These tests were performed on safety lamps of the Ashworth-Gray type, which were designed chiefly for the use of firebosses, with a view to secure the greatest possible accuracy in the estimation of the percentage of gas, by observing the height of flame cap produced in the lamp.

In the performance of the experiments by Professor Clowes, chemically pure methane was used. A large number of tests were made under varying conditions. The testing box was of fixed dimensions and all open-

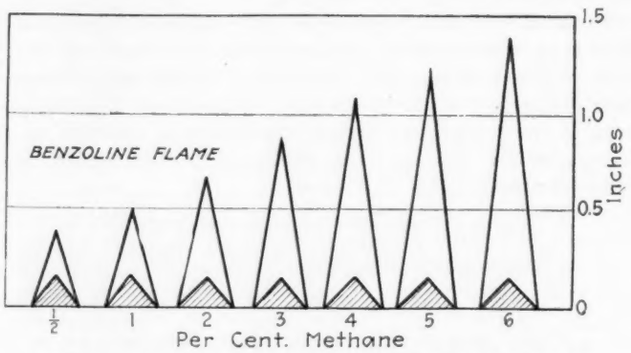


FIG. 2. GAS CAPS WITH 5 MM. BENZOLINE FLAME

ings were water-sealed. Each charge of gas and air was carefully measured at atmospheric pressure, and equal uniformity was secured by the movement of a paddle installed in the box. The results of the tests were observed through a glass window in the box. To reduce the glare and reflection, the inner surface of the lamp glass behind the flame was smoked or colored a dull

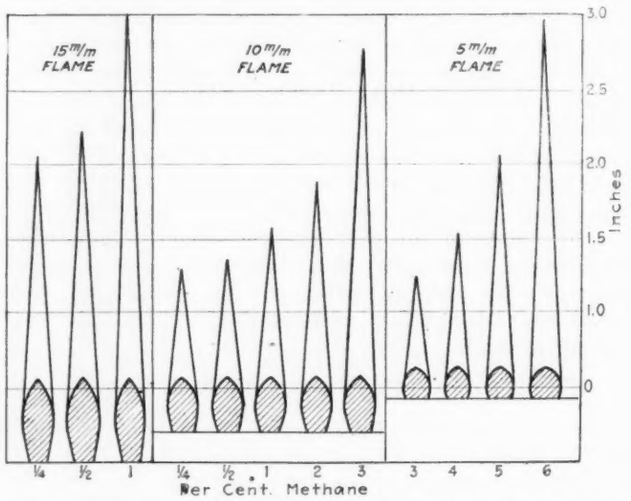


FIG. 3. GAS CAPS WITH DIFFERENT HYDROGEN FLAMES

black. The correct height of each cap was agreed on by several observers.

For the information of those not acquainted with the Ashworth-Gray type of lamp, it may be stated that its construction is such that all air entering the lamp passes through gaged openings and must pass over the wick

flame on its way to the discharge opening at the top of the lamp chimney, which is of standard size.

The illuminants used in making the tests were, in the order of their excellence, as follows: hydrogen gas, absolute alcohol or methylated spirits, gasoline or benzolene, petroleum (mineral colza), mixtures of petroleum and vegetable or seal oil and vegetable oil only.

The heights of the flame cap, for different percentages of methane present in the air tested, are shown in Figs. 1, 2 and 3.

The sensitive nature of the hydrogen flame made it possible to make three sets of flame caps, by altering the height of the original testing flame, thereby covering a range of from ¼ to 6 per cent of gas. These three sets of flame caps (Fig. 3) make it possible to compare at a glance the influence of the heat of the testing flame. For example, a 15-mm. testing flame gave a three-inch cap with one per cent of gas present in the air, while a 5-mm. testing flame only gave the same height of cap when 6 per cent of gas was present. Just here, it may be stated that the tri-wick flame of the Ashworth alcohol safety lamp also gives a three-inch cap for one per cent of methane.

In respect to safety in coal mines, when one observes a man boring a two-inch or two-and-one-half-inch hole, from seven to eight feet in depth, in a solid face of coal, and firing two or three charges of black powder in such a hole, it seems absurd to consider whether or not the presence of even one per cent of methane requires our serious consideration.

As to the standardization of safety lamps mentioned by the writer of the letter to which I refer, we may wait patiently for the report of the British Home Office committee, which is now engaged in considering the general question of safety lamps. However, it is not likely that the work of that committee will result in restricting mining practice to the use of any one particular safety lamp; but there may be required an increased lighting value in the lamp used.

JAMES ASHWORTH,
Livingstone, Alberta, Canada. Mining Engineer.

Working Three Seams of Coal in a Mountainous District

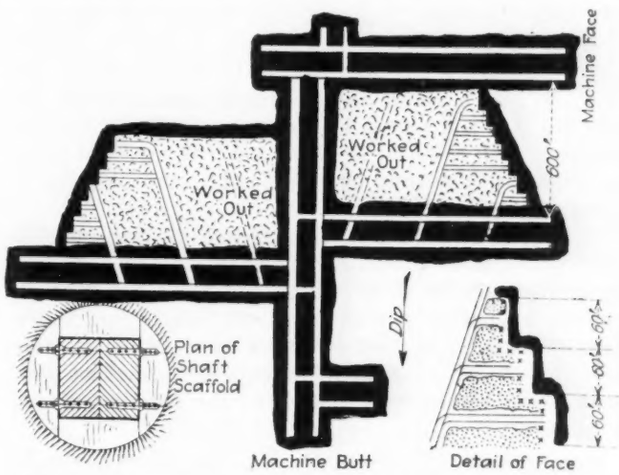
REGARDING the question of working three overlying seams of coal in the Kanawha River district, discussed in recent letters in *Coal Age*, it seems to me that particular interest attaches to the fact that the operation is conducted at the foot of a mountain, which makes it well to consider the effect of the extraction of coal in the mine to start a movement in the strata that would destroy the alignment of the shaft.

My experience in conducting mining operations in mountainous countries leads me to suggest, in this case, the sinking of two circular shafts, which would overcome any trouble resulting from a movement that would throw the shaft out of line. In one instance, I recall, such a movement in the mountain caused a 3,000-ton tipple to be thrown 60 ft. out of line when the coal was taken out too near to the edge of the mountain. However, in that case, no doubt, the great thickness of the seams that were being worked had much to do with the movement of the strata. One of the seams was 20 ft. in thickness and the other eight feet.

In a mountainous district, the subsidence of the overburden does not take place in uniform stages, as is common in a level country. In most cases, the weight of the mountain produces a crushing effect accompanied with a movement toward the river. On this account, it is always advisable to maintain adequate strength in the underground workings, particularly near the base of the mountain, especially where shaft openings are employed. As is well known, a circular shaft will withstand a greater pressure, and any lack of alignment is more easily remedied than when the shaft has a rectangular form. This alone is sufficient for recommending circular shafts.

The work of sinking is started where the location seems most suitable for the erection of a plant and the shipment of the coal. A temporary headframe is erected above the proposed shaft and a small steam hoist installed for the work of sinking. As quickly as the first seam is reached, the work of development in that seam is started and carried forward a distance sufficient to warrant safety to the sinkers when that work is resumed. As a further protection for the sinkers engaged in sinking the shaft to No. 2 seam, a movable scaffold should be erected in the shaft just below the landing at No. 1 seam.

As shown in the accompanying sketch this scaffold is supported by two girders thrown across the shaft,



SHOWING GENERAL PLAN AND DETAIL OF STEPPED LONGWALL AND SCAFFOLD IN SHAFT

which in turn support two cross-girders, the entire system thus outlining the two sides and ends of the hoisting compartment. The opening is closed by two doors hinged to the platform on each side, as indicated in the figure. When rock is to be hoisted, the doors are opened, but otherwise they are kept closed for the protection of the sinkers. The development in No. 1 seam is continued while sinking the shaft to No. 2 seam; and, as early as possible, a connection should be driven between the two shafts. When the shaft has reached the second seam and been sunk a few feet below to provide a good sump for drainage, the development in that seam is carried quickly forward in three shifts, but further sinking of the shaft is discontinued for the time.

Regarding the method of working these seams, no hard-and-fast rule can be laid down; but the nature of the roof and floor must be considered, which will generally prove the determining factor. Let me suggest, however, that No. 1 seam be worked on a longwall stepped plan, as I have indicated in the figure. This plan is by no means an experiment. It is one that I

used for several years successfully, in mining coal ranging from two-and-one-quarter to three feet in thickness and lying at a depth of 1,200 ft. below the surface.

The advantage of the stepped longwall plan is that no large break in the roof can cut off the working places, this being prevented by the steps at the working face. Success under any kind of longwall work is based on keeping the gob clear of timber, which should always be drawn to within three rows of the face. Also, all cogs and packwalls should be kept close to the face, the latter being well built. In No. 2 seam I would adopt a pillar-and-stall, panel system, ventilating each panel by a separate air split.

A system that appeals to me as good when working under a hard rock roof is that known as the Nelms' advance-retreating system, described in "Mining Methods," page 200, Coal-Mining Library, McGraw-Hill Co. The system has advantages in the concentration of work and economy of operation it affords. One of the chief features of this system is that when drawing pillars under a hard roof, too much space is not opened up before a cave occurs in the roof, thus avoiding heavy roof falls, which are always dangerous.

Danger in Driving a Road Under River with Only Three Feet of Cover

In order to reach the properties beyond the river, in no case would I recommend driving a road in No. 1 seam. Instead, a roadway should be driven under the river, in No. 2 seam, and a gravity plane driven up from No. 2 to No. 1 seam, at a distance of 300 ft. beyond the river. All the coal in No. 1 seam beyond the river can then be taken out by this incline, through No. 2 seam.

At a suitable time and whenever it is necessary to mine more coal to maintain the desired output, the sinking of both shafts should be continued to No. 3 seam, erecting as before a scaffold in the shaft, just below No. 2 landing, for the protection of the sinkers. By this time, I assume that a permanent tipple has been erected over the hoisting shaft, and the hoisting of coal is continuous.

The work of hoisting rock for the sinkers can be expedited by attaching a tail rope under the cage, by which means the bucket containing rock can be hoisted to No. 2 or No. 1 seam at the same time that coal is hoisted on the cage from No. 2 seam to the tipple landing. The rock thus hoisted can be taken to the surface during the night. With proper arrangements this can be done without interfering with the hoisting of coal from No. 2 seam.

If gas is encountered in considerable quantity in No. 3 seam, air pipes should be carried to connect with the return air-course, until the connection with the air shaft can be driven. The plan of working No. 2 seam can probably be employed to best advantage in No. 3 seam; namely, a pillar-and-stall panel system. As quickly as the development will warrant, I would drive an incline up from No. 3 seam to No. 2 seam and take out all the coal mined in the three seams by hoisting it from the bottom of the shaft. In that case, each seam should be ventilated by its own separate air split.

For the sake of economy, every effort should be made to standardize all equipment, using good cars with reliable bearings. One of the hardest problems, in my experience was that of attempting to haul coal with a cheap car having poor bearings, which kept the track constantly in bad condition. The hoisting shaft should be equipped with two cages, and a rotary dump should be installed on the surface, for an output of 1,000 tons per day of eight hours.

V. Frodsham.

New Castle, Colo.

Defer Judgment of Superintendent

ALTHOUGH I have never had a similar experience to that described in the inquiry that appeared in *Coal Age*, Feb. 12, p. 327, the recital of the electrician's failure to secure a change of position from the substation of which he had charge, to the work of bonding rails in the mine, interested me greatly.

The story of the request made to the superintendent and his abrupt and harsh refusal seems to be told in a fair, straightforward manner. However, as suggested by Richard Bowen, in commenting on the matter, every question has two sides, and the story told by the disappointed applicant gives his side of the case only. It is well, therefore, to defer judgment of the superintendent's action until the other side is known. No court of equity would pass judgement on a case without first hearing both sides of the matter in controversy.

It appears that the mine electrician considered the man at the substation capable of doing the work of bonding rails, or he would not have asked him to apply for a transfer and report to him in the mine. It can, therefore, be assumed that our man was not asking for more than he was capable of doing and the superintendent could not have refused him on the ground of his not being competent for the work. Though applicant may not have selected the best time for presenting his request, we can say that the superintendent could have refused the man without all the bluster which he is charged with making.

One cannot but wonder how this superintendent, himself, would like to be treated in a similar manner by the general manager, when making a like request of that official for a change of position where he could earn a larger salary. This is a day of discontent among miners and many of them are asking for a change of position; but when that is granted they are no better satisfied than they were before. My experience is that workmen who are the more easily dissatisfied with their work and want a change are the very ones who show the least improvement after the change is granted; but are still dissatisfied and want to be moving.

It is quite common for the younger class of miners to have a desire for the higher position and larger salary of older men who, through diligent study and application in their earlier years, have worked themselves from the bottom to the top. Younger men are very apt to want to slide into such a position for the asking, instead of preparing themselves for efficient service by the necessary years of study and application.

No superintendent should be censured too severely for using a few old-fashioned cusswords when he is suddenly confronted with an unreasonable and wholly unexpected request for a change of position, by a workman who is simply dissatisfied for no particular reason. On the other hand, some superintendents are selfish and autocratic. Such will fail to recognize the claims of a worthy young men who is aspiring for a higher position and who has been diligent in fitting himself for better work that will give him a greater earning power.

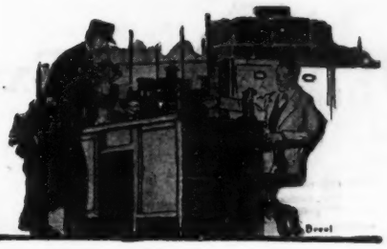
John Rose,

Dayton, Tenn. Former District Mine Inspector.

Inquiries of General Interest

Answered by

James T. Beard



Carbon Dioxide Produced in Respiration

SOME time ago, if I remember rightly, a writer in *Coal Age* made the statement, which he claimed was taken from Mauchline's "Mine Foremen's Handbook," that about 15 cu.ft. of carbon dioxide is given off in a man's breath in 24 hours. Is that correct?

Streater, Ill. STUDENT.

Both the rate of breathing and the volume of air respired by an adult depends chiefly on the exertion made by the individual at the time. For example, a man at rest (lying down) will breathe about 470 cu.in. of air per minute. The same man, when making violent exertion, may respire eight times this volume of air, or say 130 cu.ft. per hour.

Again, the percentage of carbon dioxide in the exhaled breath likewise varies with the exertion made at the time. For example, the air exhaled from the lungs of a person at rest contains about 2.6 per cent of carbon dioxide, while the percentage of this gas in the breath exhaled by a person while performing violent exercise may reach 6½ per cent.

Now, assuming that a man performing violent exercise exhales 130 cu.ft. of air per hour and that this exhaled breath contains 6½ per cent of carbon dioxide, the volume of that gas produced by the breathing of a man while performing hard work would be $130 \times 0.065 = 8.45$ cu.ft. per hour; or, 24×8.45 = say 200 cu.ft. in 24 hr.

On the other hand, if the man is at rest and exhales each minute 470 cu.in. of air containing 2.6 per cent of carbon dioxide, the volume of that gas produced in 24 hr., under these conditions, would be $24 \times 60(470 \times 0.026) \div 1{,}728$ = say 10 cu.ft., or practically $\frac{1}{20}$ of the volume of gas produced in violent exercise.

Maintaining Uniform Output by Proper Distribution of Men

THERE is one feature regarding the successful operation of a mine that has often perplexed me, and I would like to secure the opinion of *Coal Age* and its practical readers regarding the best policy to pursue in the proper distribution of men, with a view to maintaining a uniform output of coal.

It is well known that all portions or sections of a mine do not offer the same advantages in respect to mining the coal and hauling it to the shaft or slope bottom. Neither do all miners have the same productive qualities. The efficient mine foreman, realizing the importance of maintaining a uniform daily tonnage, estimates the number of cars that must come from each section of the mine, basing his estimate on the thickness of the coal, number of places working and the character of the men in each section.

It often happens that one of the most difficult features to arrange is the haulage proposition, which must be so planned that the motormen or drivers will not be required to wait for a full trip of cars. The length of haul and the number of cars mined in a shift will determine the number of trips to be made in each section. All of these matters a good foreman can generally arrange with satisfaction.

Owing to the varying capabilities of miners, the work of securing uniformity of output is another difficult problem. Naturally, the foreman wants to put the best men in places where they can produce the largest amount of coal, and he is prone to give less capable miners places where the coal is low and harder to mine. This may be the better plan to follow though it is not clear to my mind but that a more equable distribution of the men should be made, by scattering the less capable miners around where they could receive the assistance of their more capable fellows.

It is, of course, recognized that the low coal and wet places must be worked, as well as the higher coal where conditions are more favorable. What do our practical mine foremen have to say regarding this question of working all miners to the best advantage? MINE FOREMAN.

Cleaton, Ky.

The proposition presented by this correspondent is an interesting one and will doubtless bring out many opinions based on the experiences of foremen who have studied the question of distributing their men with fairness and justice to all, while at the same time seeking to maintain the required daily tonnage of the mine. Let us hear from many along this line.

Substitute for Friction Tape

PERMIT me to ask, if an electrician has no cable or friction tape at hand, but has plenty of old tape that has no cement or glue on it, can you name an ingredient or composition of ingredients that can be purchased at a local hardware or drugstore that would serve the purpose when applied to the old tape, until a new supply could be obtained. MINE MECHANIC.

Johnstown, Pa.

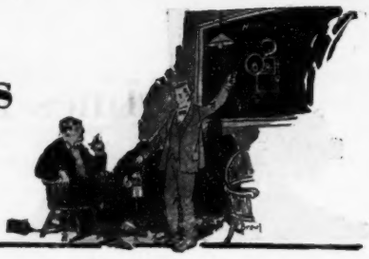
Friction tape is compounded of certain dielectric substances, its exact composition not being generally known outside of the trade. There are no adhesive articles to be purchased for application to the old tape that would renew its qualities as an efficient insulator. The original tape is a manufactured product, resulting from the treatment of a rubber base in a manner designed to give it a high resistivity and, at the same time, to increase its adhesive qualities.

The principal dielectric substances are mica, ebonite, shellac, India rubber, guttapercha, and paraffin, together with a large number of liquid hydrocarbons. We cannot recommend any makeshift application to renew the qualities of the old tape. There should be always kept on hand a good supply of tape to avoid that necessity.

Examination Questions

Answered by

James T. Beard



Miscellaneous Questions

(Answered by Request)

Ques.—A tract of coal land consists of 2,000 acres, with the coal seam 400 ft. below the surface. The seam is five feet thick and underlaid with three feet of fireclay and four feet of sandstone. Over the coal is five feet of slate and above the slate are sandstone and shale measures. The seam is known to give off gas. How would you proceed to open and develop the property for an output of 1,500 tons per day of eight hours?

Ans.—Since it is not stated in the question what the inclination of the seam is, we may assume that the coal lies practically level. Having selected a suitable location as nearly central in the property as possible and affording good shipping facilities, two shafts should be sunk at a distance of not less than 100 yd. apart. When the shafts have reached the coal a good sump should be sunk at the bottom of each and the seam opened out by driving the main headings four abreast, in each direction, say north and south, from the hoisting shaft. As quickly as possible connection should be made betwen the two shafts.

When the main headings have reached a distance of, say 50 yd. from the shaft, cross-entries should be started and driven three abreast to the right and left, respectively, of the main headings. As the cross-entries are advanced, butt headings are driven in pairs to the right and left of the cross-entries. The first pair of butts is started at a distance of, say 200 ft. from the main heading, which will provide for 50-ft. barrier pillars flanking the main headings and leave 150 ft. of solid coal on each side to form the first panels. Succeeding pairs of butts are driven on 190-ft. centers, leaving 150 ft. of solid coal between them.

As the main headings are advanced, cross-entries are driven three abreast to the right and left, at distances apart that will leave 100 yd. of solid coal between each respective pair of cross-entries. In this manner, the work is laid out in panels, from each of which the coal is extracted separately in regular order.

If possible and practicable, the extraction of the several panels should be performed on the retreating order. If this is not practicable, owing to the demand for coal or an inadequate capital making it necessary for early returns on the investment, the extraction of coal can be commenced as quickly as a panel is formed, by starting at the inby end of the panel, or midway between two pairs of cross-entries, and taking out the coal on the retreating plan, being careful to break the roof and allow it to settle on the waste as the coal is taken out.

The main headings being driven four abreast, while the cross-entries are driven three abreast and the butt headings in pairs, will provide separate return airways for each side of the mine and for each panel. Haulage should be performed on the intake air and air bridges constructed at the mouth of each set of cross-entries and at the mouth of each panel.

Ques.—State briefly how the several mine gases may be detected. In what proportion in the air are they fatal to life and in what proportion do they extinguish light?

Ans.—The presence of methane or marsh gas is indicated by the flame cap observed in the safety lamp, the height of the cap being an index of the percentage of gas present. This gas is not poisonous and when mixed with a sufficient quantity of pure air can be breathed with impunity, the fatal percentage of the gas depending on the resulting depletion of the oxygen of the diluted air. About 30 per cent of methane present in otherwise normal air will extinguish the flame of a lamp burning a non-volatile oil.

Carbon monoxide is a poisonous gas and is detected by the effect produced on small animals such as caged birds and mice. One-half of one per cent of this gas present in air breathed a considerable time will produce death and larger percentages are instantly fatal. The gas being inflammable is not extinctive of flame.

Carbon dioxide is detected by the dim burning of lamps or their complete extinction when about 14 per cent of the gas is present in the air surrounding the lamp. While this percentage of carbon dioxide in otherwise normal air may not prove fatal to a strong, healthy man, unless breathed a long time, it is never safe to remain where an ordinary lamp will not burn.

Ques.—What is meant by the term horsepower?

Ans.—The term "horsepower" is an arbitrary measure of the power required to perform any given work. The value of a horsepower is the power that will perform 33,000 units of work in a minute. In other words, a horsepower is the power required to lift 33,000 lb. through a vertical height of one foot in one minute, or 33 lb. through a vertical height of 1,000 ft. in one minute, etc.; the product of the weight lifted (lb.) and the vertical height (ft.) being always 33,000 ft.-lb.

Ques.—From what cause is one explosive stronger than another?

Ans.—The rapidity of combustion is the chief factor in the strength of a deflagrating explosive. In this class of explosives the combustion is transmitted from one particle to another by the comparatively slow process of ignition of each particle by contact with another particle that is burning. In that case, as for example with black powder, the strength of the powder depends on the fineness of the grain, the combustion being transmitted more rapidly in a powder of finer grain than in one of coarser grain.

On the other hand, detonating explosives, such as dynamite, obtain their great strength by reason of the ignition being communicated almost instantly throughout the mass, by means of a vibratory shock, the action being known as "detonation" and the entire mass exploding in an instant, as it were.

Many Mines in Alabama Strike for More Pay and Seek for Union Recognition

Daymen in Domestic-Fuel Mines Strike for Dollar a Day Increase and Are Offered 69c.—Try to Work Union Men Into Conferences with Managers as "Representatives of Miners"

ALABAMA mine workers are striking to get a provision which means the opening wedge for union recognition. They agree to the operators' proposition that "if any difference arises between an employee and the employer in or about the mines an attempt shall be made to adjust it with the boss by the person or persons affected. If no adjustment is reached, the question shall be referred to the mine foreman and mine committee. If they fail to agree it shall be taken up with the mine superintendent by the mine committee."

But here they part. The mine worker wants "a representative of the miners" to take up the question with the mine manager, while the operators, knowing that the representative of the miners will be a delegate of the United Mine Workers of America, would substitute the mine committee for that representative. Otherwise the operators and mine workers agree on the clause relating to the settlement of grievances. The manager and the other party—committee or representative—failing to make an adjustment, shall name a third party, "whose decision shall be rendered in five days and shall be final and binding on both parties." The difference seems small but it is in reality an important matter, for the entrance of the labor agitator as representative bodes nothing but trouble.

Another point about which the operators and mine workers disagree is the increase in wages to be given under the decision of the Bituminous Coal Commission. The operators would give an advance of 20 per cent to day laborers and monthly men as against $1 a day asked by the miners. Both factions assert that they are following their interpretation of the proposals of the commission appointed by the President, a commission before which the Alabama operators failed to appear. The operators quote this paragraph on page 38 of the report of the commission:

"We direct that this increase be apportioned between the different groups of workers and classes of work along the following lines: That tonnage rates, pick and machine, be increased 84c.; that rates for all yardage, deadwork, narrow work and room turning be advanced 20 per cent; that the compensation of daymen be advanced also 20 per cent. All these advances to apply to the rates prevailing on Oct. 30, 1919."

The union leaders refer them to paragraph F of the "award": "That all day labor and monthly men (the advance to monthly men to be based on the average of the usual number of days they are required to work in a month), except trappers and other boys, be advanced $1 per day. Trappers and boys receiving less than men's wages shall be advanced 53c. per day."

The operators accept the rule quoted in the first paragraph in both letter and spirit, declaring that $1 a day increase would not be a 20-per cent advance but an increase of over 27 per cent.

In the fields where the $1 a day increase is granted the minimum scale was $5 per day, and in that case a 20-per cent increase would be equivalent to an advance per diem of $1. However, the minimum wage scale in Alabama was $3.44 a day. Thus in Alabama a 20-per cent increase would be only 69c. per diem or thereabouts.

J. R. Kennamer, president of the Alabama section of the United Mine Workers of America, district No. 20, has made public correspondence between himself and the members of the commission, in which Rembrandt Peale says that he could not commit himself as to the manner in which Alabama operators should interpret the report of the commission, for they refused to come and submit their status with the mine workers. He says that for that reason he did not know how the decision of the commission would affect them.

J. P. White states that he believes the men should receive $1 a day increase. The operators reply that he did not sign the majority report of the commission and therefore could not tell what the majority really means by the order. Mr. Robinson's reply also states that the miners should receive their dollar a day, but the operators claim that Mr. Kennamer's letter to Mr. Robinson was somewhat misleading and they have made public a telegram received from him by the DeBardeleben Coal Co. in which he states that they should work out their own plans based on the former adjustment.

Mr. Kennamer has sent copies of this correspondence to the different local unions with the statement that they should do whatever they could toward getting the $1 a day advance but that they should not attempt to coerce the operators by a strike.

The operators have had further correspondence with Mr. Robinson and he again states that the Alabama operators and miners must work out their own plans, recognizing, however, the fact that a 27-per cent increase was all that was required of any operation. Both sides seem to be standing pat.

The strike at first was confined to the domestic fields, but it rapidly spread to the other fields where the coal mined is used for making iron and steel. Three mines of an iron company shut down on July 5 and it was stated that 3,000 men were out on strike.

About this difference there have been strikes at the Piper and Coleanor mines of the Little Cahaba Coal Co.; Garnsey mine of the Galloway Coal Co.; Marvel mine of the Roden Coal Co., all in Bibb county, at the Boothton mine of the Southern Coal and Coke Co. in Shelby county; at the Kellerman mine of the Central Coal and Iron Co., the Yolanda mine of the Yolanda Coal & Coke Co. and the Davis Creek mine in Tuscaloosa County; the South Corona, Corona, Patton, Coal Valley and Patton mines in Walker County.

Some of these mines have not worked for over a month, rations to the mine workers being provided by the union. Non-union men are still mining a little coal at Townly, Corona, Patton, and Coal Valley operations of the Corona Coal Co., but most of the men are out.

Mine Inspectors at Cleveland Convention Discuss Standardizing of Safety Regulations

Papers Presented on History of Mine Inspection, Avoidable Accidents, Standardization of Electrical Installations and Ventilation Requirements and the Sealing Off of Abandoned Workings

By James T. Beard

THE eleventh annual meeting of the Mine Inspectors' Institute of America met in the "Lattice Room" on the mezzanine floor of the Statler Hotel, Cleveland, Ohio, Tuesday, July 13, 1920, with a good representation of the different coal-producing states in attendance.

In the absence of the president, Thomas Graham, Cumberland, B. C., Canada, the meeting was called to order by the secretary, James W. Paul, Pittsburgh, Pa., who introduced Jerome Watson, chief mine inspector of Ohio, as temporary chairman. By vote of the members present Mr. Watson was made permanent chairman and the business of the organization proceeded without further delay.

The first item on the program was the appointment of a committee on membership, and the following were named by the chairman: James Sherwood, Kansas; W. L. Morgan, Illinois; Miller D. Hay, Oklahoma. The committee was instructed to consider at once the large number of applications that had been placed in the hands of the secretary and report the names for immediate action of the institute. This was done in order that the new members could participate in the work of the organization.

The other committess then named by the chair were the following: Committee on Resolutions—William Holland, Iowa; James T. Beard, New York; John Dunlop, Illinois. Auditing Committee—Lot Jenkins, Ohio; Walter Waite, Illinois; James Sherwood, Kansas.

History of Inspection in Last Decade

By vote of the members present Jerome Watson was made chairman of the entertainment committee and selected Frank P. Corey and Lot Jenkins, both of Ohio, to act with him on that committee. This being done the session adjourned till 2 p.m. in order to give the auditing and entertainment committees an opportunity to work.

The afternoon session was devoted to the reading of a paper entitled "A Decade in the History of Mine Inspection," by James T. Beard, editor for the institute. Secretary Paul then read an interesting and valuable paper that had been prepared by William C. Kidd, state inspector of mines, second district of Illinois. This paper declared that avoidable accidents in and about mines were largely due to indifference on the part of the mine officials whose duty it is to provide the employees, as far as possible, with safe working conditions. An animated discussion followed the reading of the paper and a vote of thanks was extended to its author.

The committee on entertainment reported that through the courtesy of F. K. Maher, president of the Pittsburgh Vein Operators' Association, they had completed arrangements for an all-day boat ride on the lake, and the meeting then adjourned to continue its discussions the following day on the quiet waters of Lake Erie. Although the weather was not as propitious as might be wished for the sail that did not hinder the members of the institute and their guests from assembling at the pier and at 8:15 Wednesday morning the steamer "Theodore Roosevelt" swung out into the lake with all on board.

Technical Session on Lake Erie Boat

After inspecting the boat in its many quarters and listening to an enjoyable musical program rendered by the ship's orchestra the institute withdrew to the privacy of the forward cabin on the upper deck, which had been reserved for its use. Here the members were called to order by Chairman Watson, who announced for discussion the first topic on the program, "Standardization of Electric Code for Mines."

The discussion was opened by Secretary Paul, who outlined in a clear manner the need and purpose of standardizing an electric code for use in mining. Others followed, enlarging on the conditions to be encountered in the application of a standard code to their several districts, and L. C. Ilsley, engineer in charge of the electrical department of the Pittsburgh testing station of the Federal Bureau of Mines, explained the work that had already been undertaken by the bureau as a preliminary to effecting such a standardization in electrical mining codes.

Other topics discussed in the sessions on the boat were: "Standardization of Inspection Routine" and "Standard Requirements for Mine Ventilation." The discussion of the last-named subject culminated in a motion instructing the committee on resolutions to draft a resolution for presentation to the institute embodying the conclusions reached. The session was then adjourned, to meet the following morning in the quarters at the hotel.

The closing session of the institute was called to order at 9:30 a.m. in the "Lattice Room" of the Statler Hotel Thursday, July 15, by Chairman Watson, who announced for discussion the final topic on the program, "Methods for Sealing Abandoned Workings," which occupied one hour and evoked much interest.

To Bring Mining Codes Closer Together

A brief address followed from S. E. Button, chief of the Department of Mines of Pennsylvania. In a happy manner Mr. Button expressed his pleasure at being present and congratulated the institute on the work in which it was engaged, emphasizing the need existing that the mine inspectors of the different states and provinces should thus co-operate.

The chair then called for the report of the committee on resolutions, and William E. Holland, state mine

inspector, first district, Iowa, chairman of the committee, responded and presented the following:

Resolved, that the Federal Bureau of Mines prepare an outline of standardization for such mine matters as from their experience and investigations they feel can be standardized, ever having in mind the varying conditions of mining obtaining in the several states engaged in the mining industry.

Resolved, that said outline of standardization be submitted by the Federal Bureau of Mines to the mining department or the mining board in each state, with the request that it receive the earnest consideration of the men composing that body, so that, as far as practicable, they may endeavor to secure the enactment of such laws in their respective states as will make effective the several requirements, and thereby establish the desired uniformity in all laws and methods pertaining to safe and economical mining.

Resolved, that the Mine Inspectors' Institute protest against the discontinuance of the monthly publications on mine accidents and Judge Thompson's "Abstracts of Decisions in Law Cases," realizing their importance and the constant demand for them, particularly those relating to mine accidents, on the part of state mine inspectors, officials of miners' organizations and liability-insurance men. Attorneys and safety engineers repeatedly make requests for Judge Thompson's bulletins.

Resolved, that it is the unanimous opinion of the Mine Inspectors' Institute that the adequacy or inadequacy of the ventilation of all mines should be estimated by some uniform method and that any such method must be based on such essentials as the quality and velocity of the air sweeping the working faces and circulating in every part of the mine. Be it further resolved, that the Federal Bureau of Mines render such scientific aid and suggestions that ultimately such methods will be perfected and applied as will be suited to the making of such determinations.

The balloting for officers for the ensuing year resulted in the choice of the following: For president, Jerome Watson; first vice-president, Charles H. Nesbitt; second vice-president, W. E. Holland; third vice-president, James Sherwood; secretary, James W. Paul; assistant secretary, Millar D. Hays; treasurer, Joseph Haskins; editor in chief, James T. Beard. By vote of the members present the next annual meeting of the institute will be held at Charleston, W. Va., beginning July 14, 1921.

Machine Men in Indiana Strike Against Night Work and About Bottom Coal

REFUSAL of machine men to cut coal at night has resulted in temporary suspension of work in half of the mines surrounding Bicknell, Ind. The miners declare they would not object to night work for a few nights or weeks if they had any assurance of a definite time when day work would be resumed. They state that it is an effort of the operators to put them on nights permanently.

Machine men at the Westphalia mine of the Knox County Fourth Vein Coal Co. returned to work recently after having been out for several days. The controversy originated over the bottom-coal question, which has caused trouble in some of the mines of the district. After some consideration the machine men agreed to go back under the terms of the contract. About one hundred men were affected.

Union Labor Stubbornly Opposes State Owned Mine in Indiana

STUBBORN opposition has developed in the State Legislature, which convened in Indianapolis July 12, to the proposal of Governor James P. Goodrich and the state purchasing committee that the state buy a coal mine and cars in order that coal may be provided at a lower cost to the state institutions than would prevail in case the coal were purchased on contract or in the open market. So far the chief antagonism has been from the coal fields where there is a large union labor vote. From present indications the hostility is such that the Indiana operators, who are known to oppose the proposition, but who have said little, may continue to keep their thoughts to themselves.

The organized labor opposition lies chiefly in the fear of unions that the state will either immediately or later attempt to operate the mine with convict labor. Governor Goodrich is known to favor such a proposition. In his statement to the Legislature the Governor deals with the cost of mining coal under private ownership and the relatively low cost which he insists the state could operate a mine on. He cites the low cost of the manufacture of various articles in the state penal institutions to prove the state might operate a mine below average costs.

Organized labor is searching for the "joker" in the plan. At a meeting held the second day of the session in the office of Charles Fox, president of the Indiana Federation of Labor, and attended by representatives of the different state labor organizations, a resolution was passed in which it was stated that labor would be in favor of a state-owned coal mine provided only union labor would be employed in the mine and that the mine were operated under the same contract which is entered into with the Indiana coal operators and miners.

Power to order 100-per cent railroad car service for mines supplying state institutions with coal would be conferred on the State Public Service Commission by a bill passed July 14 by the House of the Indiana General Assembly. The vote was seventy-eight to fifteen after the rules had been suspended by a smaller vote. Speaker Jesse Eschbach, preceding the passage of the bill, said that the "people have about lost patience in regard to the coal situation" and that a remedy should be brought about at once so that the situation might be improved. He further declared: "I am sorry that we cannot put every coal mine in the state under the jurisdiction of some state commission or board. I would like to see the coal prices handled the same as the rates of the water and light companies."

Spadra Miners Want Supply Prices Cut

THOUGH the strike has not been authorized the officials of the United Mine Workers at Fort Smith say that the strike of 800 mine workers in the Spadra (Ark.) field against alleged profiteering prices for supplies will not be ended until the condition is relieved. The operators say their changes are below cost now, but the mine workers feel that the old prices should rule regardless of the ability to buy supplies at such figures. The officials, who did not authorize the strike, seem, however, quite indifferent about the matter and are not disposed to counsel the men to return to work.

Hard-Coal Operators Meet Lauck's Statements That Miners Are Underpaid and Short-Lived*

Mine Workers Make More Than Lauck Has Declared—Budgets Presented Are Based on Conditions with Which Mine Workers Are Not Confronted—Coal Miners Are Not Subject to Premature Old Age

BY DEVER C. ASHMEAD
Wilkes-Barre, Pa.

IN CONTINUING the testimony of July 14 the operators completed the presentation of Exhibit No. 7, in reply to Miners' Exhibit No. 4, which latter exhibit appeared in full on pages 143-146 in our issue of July 8. In their exhibit the operators make a detailed analysis of the assertions made in the summary of the miners' exhibit and challenge every figure given by Mr. Lauck, giving the correct figures.

Hoffman shows that it is not general practice of life insurance companies to require of anthracite mine workers that they pay a rate such as is charged to men in other occupations who are sixteen years their senior nor is it the practice to issue only endowment insurance to anthracite mine workers. A fairly high accident rate in the metal mines combined with an abnormal death rate from tubercular disease in metal mines producing siliceous ores is the reason why one company quoted by Mr. Lauck classes all miners as exceptionally poor risks. Hoffman proves that their expectation of life is about normal.

This exhibit, its analysis completed, winds up with a quotation from the testimony given during the cross-examination of the mine workers. Mr. Warriner, in the course of this grilling, had said to Mr. Lauck: "I will pass over the summary with this question: If the comparison as to annual earnings, deduced as you have deduced it, using one base for the anthracite region and another for the bituminous region, and if your assumption that 252 days were worked in the anthracite mines and 248 in the bituminous mines is proved incorrect, the general summary of conclusions which you have drawn from these figures would naturally fall?" Mr. Lauck answered: "Yes, sir . . . If the exhibit can be impaired the summary can be impaired."

Following this was presented Operators' Exhibit No. 8, in reply to Miners' Exhibit No. 5, "Average Full-Time Weekly Earnings in the Anthracite Mines of Pennsylvania." In this the operators claim that the test of the exhibit is as misleading as the title, for the following reasons:

(1) The data from which the tables are compiled were inaccurate and not representative of actual conditions. (2) The number of cases taken were not sufficient to build up reliable averages. (3) The method employed in working up the data available was incorrect and could only produce erroneous results and conclusions.

In the answer to the miners' exhibit the operators show actual figures from companies producing 50 per cent of the output and thereby show how erroneous the figures are that were presented by the miners. The operators' exhibit shows that the comparison indicated in Table I exists.

The exhibit says that under cross-examination Mr. Lauck admitted that the earnings shown in the exhibit were hypothetical, but the best that his force could secure under the circumstances, and it winds up its analysis of the miners' exhibit by saying "In view of this admission, and in consideration of the figures submitted in this response, the operators claim that the entire exhibit is meaningless and of no value for the purposes of determining the present controversy."

The operators then presented their Exhibit No. 9, in reply to Miners' Exhibit No. 6, "Wage Rates in New York, Philadelphia, Pittsburgh and Buffalo." This exhibit points out that the rates of wages in the cities just mentioned have no relevancy with regard to the rates in the anthracite region, for the cities mentioned are remote from the anthracite field and the conditions there prevailing are entirely different from those that exist in the anthracite field.

COMPARISONS IGNORE SEASONAL VARIATIONS

Furthermore the rates with which comparison is attempted to be made vary considerably and the seasonal character of the industries is not taken into account in presenting the figures. This is an important omission, as the anthracite industry, with which the others are compared, is not a seasonal industry. The following conclusion is given in the exhibit:

"It is therefore respectfully submitted for the several reasons noted above that Exhibit No. 6, showing the rates for certain occupations in the large centers . . . are not germane to the subject of wages under discussion before this commission. They therefore have no weight or bearing in this reading and should not be considered a factor in the determination of the findings."

TABLE I. COMPARES MINERS' EXHIBIT WITH FACTS

	Miners' Exhibit No. 4	This Exhibit
Miners	$1,250	$1,784
Miners' laborers	933	1,309
Other occupations	935	1,356

*Previous articles on this commission are "Mine Workers Present Their Initial Argument to Anthracite Wage Commission," pp. 29-31; "Anthracite Mine Workers' Argument for a Larger Wage Presented by Mr. Lauck," pp. 80-82; "Warriner Shows Up Many Misinterpretations of Fact in Lauck's Voluminous Exhibits," pp. 123-128; "Anthracite Commission Decides That It Is Not Empowered to Consider Prices and Profits," pp. 181-184; Exhibit 4, pp. 143-146; Exhibit 12, pp. 138-142; Operators' Exhibits 1 and 2, pp. 193-205.

In Exhibit No. 10, in reply to Miners' Exhibit No. 11, "A Survey of Costs of Living of Anthracite Mine Workers' Families," the operators emphasize the fact that the mine workers' figures are based on a study of only 371 families, and allege that the data do not form a fair basis for judging family expenditure or for constructing a family budget, for the following reasons: (1) The figures were gathered in a way that would admit of substantial errors which would make the results unreliable. (2) The family of 6.5 persons, "including boarders," is not a fair standard unit and is not comparable with other standard family units. (3) The months of December, January and February, while months of heavy expenditure, do not, as claimed, offer a little more than average earning opportunity to the miner.

The exhibit then proceeds to show that if a standard family of five had been taken, the budget for practically every family would show a surplus instead of a deficit.

Earning Power, Not Wages, Is Criterion

The next exhibit was No. 11 and it contained a reply to Miners' Exhibit No. 12, "The Relationship Between Rates of Pay and Earnings and Cost of Living in the Anthracite Industry of Pennsylvania." The main purpose of this exhibit is to point out that while the mine workers show that a 31-per cent increase is needed to bring the pay of the anthracite miner to a parity with that of the bituminous miners, by the mine workers' own figures and by other figures that the mine workers failed to consider it can be shown than an 18-per cent increase would suffice to put the anthracite mine worker on a level with the bituminous worker.

This exhibit shows that instead of the miner not receiving sufficient increases for him to keep up with the cost of living he has actually received more than enough to do so. This is well brought out, for in Mr. Lauck's exhibit he considered only one of the three factors entering into the earnings, that of rate of pay, whereas the operators show all three factors that should be taken into consideration: (1) The rate of pay per unit. (2) The time required in producing that unit. (3) The number of days worked in the year. The exhibit reiterated a number of statements in regard to the correctness of the mine workers' figures, but they need not be repeated here.

During the hearing Mr. Murray made two objections, both urging on the commission that the operators were endeavoring to introduce testimony of a character that the mine workers had been debarred from introducing, and this testimony was stricken from the record. Mr. Murray stated that the mine workers did not accept the operators' figures as correct, either as to earnings or as to days worked, and he requested the commission to investigate those figures carefully, for until they have been proved correct the mine workers' figures must be accepted as being as reliable as those of the operators. The commission took this point under advisement.

The morning session of July 15 opened with the presentation of Operators' Exhibit No. 12, in reply to Miners' Exhibits Nos. 8, 11, 13, 14, 17, 18, 19, 20, 21, "Dealing with the Cost of Living and the Living Wage." At the outset of this exhibit the operators presented their epitome of the mine workers' arguments, and, as they view them, they are as follows:

(1) The lowest grade of unskilled workman in every industry has a right to a living wage.

(2) A living wage is to be arrived at:
   (a) By a study of theoretical family budgets which give both quantity and quality of commodities necessary for a standard of healthy and decent living.
   (b) By predicating these family budgets upon a so-called typical American family composed of man, wife and three children under fourteen years of age and supported by a single wage earner.
   (c) By translating these commodities both as to quality and quantity into prevailing prices.

(3) The principle of a living wage is sanctioned by many prominent men and women and by students of economics and social problems.

(4) The living wage can be attained in practice because the total amount of production shown in the 1914 Census of Manufacturers would suffice to supply all American families with the quantity of commodities required by the budget.

(5) Anthracite mine workers have not received in the past and are today not receiving such a living wage, because the wage rate prior to the war was below a living wage and the wage increases have not kept pace with the rising cost of living.

(6) Therefore wage rates of the common unskilled workman in the anthracite industry should be made $6 per day.

Operators Answer Economic Claims

In reply to these arguments it is submitted that:

(1) The anthracite operators have been and are paying living wages to their employees.

(2) Due consideration has been given in all wage agreements with the mine workers since the wage adjustment of Nov. 1, 1902, to conditions of living, the maintenance of health and comfort, and the general trend of wages in other industries.

(3) The establishment of a wage scale based on the budget plan is impracticable, due to individual differences in capacities and requirements and the necessity for equal compensation for equal service.

(4) However desirable it may be that every worker shall be paid a wage commensurate with his reasonable needs for the support of himself and his family, the value of the services performed must ever be an essential factor in the preparation of a wage scale.

(5) Finally, the only fair and practical test of the wage status of employees in a given industry is the actual facts bearing on them: (a) The general prosperity of the employees where the industry is the dominating one in the section. (b) The financial status of the banks, particularly savings banks. (c) The patronage given to places of amusement and the time taken for recreation. (d) The general evidence of comfort that prevails among the workers in that industry.

As far as the general proposition that every industry should pay its employees a living wage is concerned there is no difference in opinion between the operators and the miners.

The operators show that the arguments presented by the mine workers which deal with a living wage and the

cost of living should not be granted by the commission because:

(1) The methods employed by the anthracite miners in arriving at a so-called living wage are unsound and impractical. There is no general agreement in the opinions presented by the miners as to what a living wage should be. Miners have attempted to determine it by a study of budgets which are for localities other than the territory in question. They have, it is true, made a hasty attempt to obtain figures for the anthracite field, but these are extremely inaccurate. The budget plan is, however, economically unsound because it gives consideration to only one side of the problem, that is the miner's desires, and does not consider his productive effort.

Importance of Value of Service Performed

(2) The cost of living calculated on the budget plan for anthracite mine workers is too high. The figures presented by the miners are inaccurate, for, instead of forming a subsistence budget, as they claim, they are minimum-comfort budgets. At this point the operators show that budgets drawn for different parts of the country at the same time are higher in some places than in others, therefore a standard budget cannot be used. At this point Mr. Lauck requested the commission to have the Bureau of Labor calculate a budget for the anthracite field as had been done for the bituminous field. Mr. Warriner replied that the operators entirely reject the budget plan.

(3) No consideration is given in the argument offered by the miners to one essential factor in the preparation of a wage schedule—that is, the value of the service performed. Even the miners' representatives have considered that it would be bad economic law to pay a man more than he could produce. Provision, it is true, must be made to care for the incompetent, but the productive effort of the workman must nevertheless be measured and his reward must be adjusted accordingly. It appears further that no such wage is to be paid unless it is earned and that there are those who are incapable of earning a living wage.

(4) In reality the anthracite operators have been and are paying living wages to their employees. A group of workers cannot be running behind in expenditures month by month for so-called necessities and yet show every evidence of well-being in their method of living, in their dress and in their accumulation of a surplus in the savings banks. "The proof of the pudding is in the eating."

Men Are Not Fed on Economists' Statistics

The evidence presented in the mine workers' exhibit shows conclusively that the anthracite industry has become more and more stabilized, that the opportunity offered workmen has grown progressively better, and that wages have increased with each new agreement with due consideration of living cost, to the maintenance of health and comfort, and to the general trend of wages in other industries. Observation in the anthracite region will readily reveal the fact that workmen have time for recreation, that they have means to patronize places of amusement and that there prevails a condition of health and comfort among the workers.

This condition not only give the true test of a fair wage but also effectively contradicts conclusions drawn from theoretical, superficial and unreliable data collected in a hasty survey and not applicable to the anthracite situation. A fair test of a fair wage is whether it works out fairly to both employer and employees.

Nystagmus, Beet Hand and Beet Knee

The last exhibit, Operators' Exhibit No. 13, in reply to Miners' Exhibit No. 26, "Occupational Hazard of Anthracite Mines," while submitted by the operators, was prepared under the supervision of Frederick L. Hoffman. It begins by referring to the writings of Sir Thomas Oliver and Dr. Frank Shufflebotham, of England, and regretting that no reference was made to their findings in the mine workers' exhibit. Unfortunately the mine workers were only too ready to go to Europe to sustain their case whenever it seemed advisable to do so. They introduced the possibility that the miners and their co-workers in the United States might be affiliated with nystagmus, beet hand and beet knee.

The exhibit well says that "they are practically unknown in the mining industry of this country, and even miners' phthisis—a recognized occupational affliction [not of coal mining, however.—Editor]—is rarely met with in its true form in the anthracite region." Oliver's statements and those of Shufflebotham are germane to American conditions, but there is danger in taking Europe into the discussion, for while by so doing it may be possible to strengthen a perfectly good case against tuberculosis it is equally likely to bring in nystagmus, beet hand, beet knee and another disease which does not afflict our American coal miner but does afflict miners in other countries, namely, hookworm.

Perhaps It Is, but Then Perhaps It Isn't

The operators' exhibit well stigmatizes in the mine workers' document such overstatements as "Perhaps no industry is so subject to occupational hazards as the coal industry." It does not mean anything as evidence. Put the word "perhaps" at the end of the sentence and it then, without changing the meaning, makes it perfectly clear that the writer of the paragraph was in serious doubt himself but trusted that fact would not be apparent to the commission.

Worse yet was the statement "The general mortality of the anthracite miner is distinctly above the average of all occupied males." The operators well say of this: "There is no evidence in support of this statement, which is mere conjecture and guesswork and not a statement of fact, which alone is entitled to consideration. No really qualified comparison has been made of the mortality from all causes of anthracite coal miners and the corresponding mortality of men in all occupations."

The most striking hit in the miners' exhibit on "Occupational Hazards of Anthracite Miners" is this: "A large and representative life insurance company will accept coal miners only if they pay rates for sixteen years above their actual age, and even then it will permit them to have no cheaper form of policy than a 20-year endowment; only one occupation is subject to more drastic conditions."

What Becomes of New York Life Presentment?

The reply of the mine operators is: "The practice of the New York Life Insurance Co., to which the reference is made, is not representative of life insurance companies at large, and many of the foremost institutions differ essentially and fundamentally in their treatment of coal miners as insurance applicants. A much more representative company, which transacts a large

amount of business in the anthracite region and which has insured at the present time a considerable number of anthracite miners on the 'ordinary' plan, in addition to a vast 'industrial' business, accepts underground miners at 'medium rates,' and on the whole-life plan as well as on the endowment, which at the age of thirty compares with the non-hazardous risk as follows: The normal charge of this company is $20.80 per $1,000 of insurance, while the medium rating charged to underground anthracite miners is $25.64, or $4.84 in excess of the normal. The difference of sixteen years charged by the New York Life Insurance Co. would amount to $7.77, and if accepted as evidence of a correspondingly high mortality would lead to entirely erroneous conclusions."

Does Not Surrender Sixteen Years of Life

The exhibit continues by quoting a statement of the mine workers' document which reads thus: "While it may not be strictly accurate to say that a life insurance company regards the miner's life as sixteen years shorter than the life of a person in a safe occupation, yet that is what the above rating practically amounts to." The operators' exhibit says: "It is respectfully submitted that this is a most absurd conclusion, which cannot be accepted by anyone familiar with elementary vital statistics and is liable to mislead the commission in one of its most important conclusions."

But still more convincing is the following: "Furthermore, it requires to be said that the rating in question, largely as a matter of convenience, applies to both coal and metal miners and to anthracite and bituminous miners alike. Life insurance companies cannot go too far in refining extra-premium charges in their effort to do exact justice to every highly specialized group of applicants. Mining risks are, therefore, considered in general, but with due regard to local conditions cases are frequently adjudicated on their individual merits.

Anthracite-Mining Hazards on Decrease

"But the main point is that metal miners, or men working in the deep quartz mines of the West, are subject to a decidedly higher respiratory and tubercular hazard than men working in coal mines, and the so-called miners' phthisis, or fibroid lung disease, is rarely met with among anthracite workers, while relatively common in the copper, zinc and lead mines of the West."

The exhibit then considers the amazing statement, undated and unlocated as to source but credited to a report of the Director of the U. S. Bureau of Mines: "The hazard of (coal) mining is undeniably on the increase." "This statement," says the exhibit, "separated from the text and without precise indication of the period for which it is made, is likely to lead to serious misunderstanding." The exhibit points out that Messrs. Lauck and Harris terminate their tables in 1916, despite the fact that more recent information is obtainable in sources that could not be overlooked.

Here are the facts: The number of underground mine workers in Pennsylvania anthracite mines killed in 1915 was 516; in 1916, 474; in 1917, 467, and in 1918, 442. "It is true," says the exhibit, "that in 1919 a large number were killed, due to the extraordinary accident at Baltimore Tunnel No. 2, which was caused by purely fortuitous conditions suggestive of more stringent rules and regulations in the transportation of explosives rather than affecting actual mining operations.

Perhaps there is another explanation more befitting Messrs. Lauck and Harris and their kind. They seem to prefer ancient to modern history. They are prone to ask that correctives be applied today for conditions which long ago existed. They forget that the wage of today should be framed to meet today's problems and not those of many years back. The risk of 1920 might reasonably be considered to have some bearing on the wage of 1920, but not the risk of years gone by.

But on the other hand, the admirable efforts of the coal companies to promote safety first can hardly be considered as of bearing in the matter. The present accident and fatality rate is what really counts, and the anthracite mines have a record for fatalities which in the coal mines of many other states is unfortunately much exceeded. In the year 1918 the anthracite fatality rate was 3.20 per thousand 2,000-hour workers against 4.42 per thousand for Utah; 4.78 for Colorado; 4.89 for West Virginia; 5.87 for Washington and 6.27 for New Mexico.

Hard-Coal Fatality Record Lower Than Soft

The operators' exhibit quotes these rates and then adds: "The present fatality rate of the anthracite region is even below the corresponding rate for the bituminous region of Ohio (3.42) and for the whole soft-coal regions of the United States (3.24). It is, therefore, quite misleading to imply that anthracite mining is today exceptionally hazardous; as a matter of fact, present life-insurance practice with regard to this class of risks is decidedly more favorable or liberal than it was ten or fifteen years ago."

The exhibit takes exception also to the statement: "The leading causes of death are respiratory diseases and industrial accidents," declaring that "from such data as are known to us the conclusion would seem justified that organic heart diseases, for illustration, are more frequent among anthracite miners than lobar pneumonia." It meets the statement that "the total sickness rate among miners was 8 per cent higher than the general rate for white adult males" by stating that the report was prepared by two writers for the Pennsylvania Social Insurance Commission who were advocates of social insurance and who made no original investigations but relied on the sickness statistics of bituminous miners.

As meeting the allegation of the mine workers' exhibit to the effect that the non-fatal injuries chiefly resulted in a disability to arms and legs, with consequent inability to resume work on recovery, "the only statistics on the subject," say the authors of the operators' exhibit, "are those obtained in the statistical analysis of workmen's compensation insurance for the period 1916-1918 compiled by the Insurance Department of the Commonwealth."

These statistics, unfortunately, entirely omit anthracite mining in the tabulation of accidents causing fatal and major permanent injuries. It may therefore be assumed that if the experience had been sufficiently suggestive of serious conditions inherent in the industry it would not have been excluded in a report which represents the most painstaking investigation ever made in this or any other state."

The mine workers in their exhibit quote the Pennsylvania State Commission on Old-Age Pensions to the effect that "miners age prematurely." The operators respond that "this statement also is mere conjecture and easily contradicted by an appeal to such facts as are available at the present time. Neither the said

commission nor any other authority, however, has made a thorough inquiry into all the facts which require to be taken into account.

"It is an erroneous conclusion to assume that miners do not attain to old age, and, as shown elsewhere in the miners' exhibit, the proportion of all miners attaining to old age, or say 65 years and over, is not below but apparently above the normal for all occupations. In the experience of the Metropolitan Life Insurance Co., as shown in one of the tables of the mine workers' exhibit, this proportion was 23.3 per cent, but it is somewhat doubtful whether the term "miner" was not made to include persons who formerly had been following mining but at death were engaged in some other occupation. For all occupations, as shown by another table on the same page, this proportion was 20.3 per cent.

"In the corresponding experience of the Prudential Insurance Co. of America the proportion was 13.4 per cent. All insurance experience is subject to the restriction that everything depends upon the age distribution of the insured population.

Life Expectation of 51 Years Is Normal

"The most convincing experience, however, is the high average age at death for coal miners in the Metropolitan experience, given as 51.3 years, and the corresponding figure for the Prudential, which has been given as 49.4 years. In any adult population it is safe to say that an average age of 51 years is rarely exceeded by more than a year or two.

"Higher average ages are found in old New England communities, where the young have moved away, where the birth rate is low, and where otherwise exceptional conditions prevail. Much lower average ages at death are found in the Southern states where in former years conditions injurious to health materially diminished normal longevity. But an average of 51 years at death may safely be considered evidence that the statement made that miners age prematurely is contrary to the facts."

Reference is made later to the inadequate medico-actuarial experience based on the deaths of only 66 anthracite and 45 bituminous coal miners. On this slender foundation it had been stated by the mine workers' exhibit "that the anthracite miner has a death rate at least 91 per cent higher than the average." A later reference to this statement in the operators' exhibit says: "If this is so it would be interesting to have some explanation forthcoming as to why the average age at death should be 51.3 years."

Certain Industries Can Get no Insurance

The operators' exhibit, while denying that the practice of the New York Life Insurance Co. of adding sixteen years to the age of the applicant for insurance is followed by "any other representative insurance company transacting business in the anthracite coal fields," says that "There are numerous occupations which are not accepted at all and which are not mentioned in the list that forms part of the mine workers' exhibit, such, for illustration, as high-seas fishermen, manufacturers of explosives, aviators, submarine divers, etc., etc., all of which represent employments more hazardous than anthracite mining."

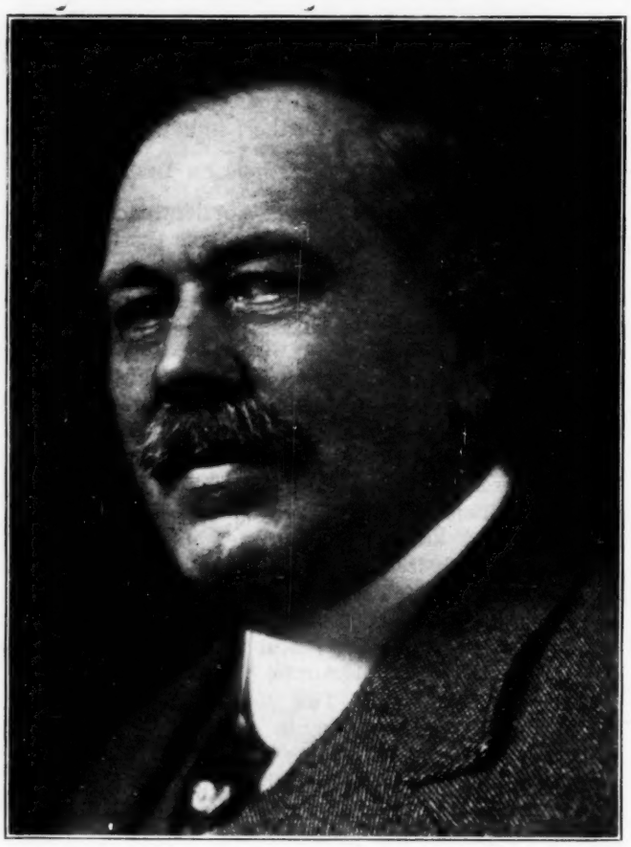
The fact that the miners' exhibit shows that "there are some companies that write ordinary insurance for miners" and charge only 10 per cent more for miners than for ordinary workers indicates over-emphasis on the practice of the New York Life Insurance Co.

The operators finished the presentation of their case in the morning and in the afternoon they cross-examined Mr. Dempsey in regard to an exhibit he presented as to prices in the upper field. The most interesting point that Mr. Warriner brought out in this examination was that Mr. Dempsey was strong at making mathematical errors.

Upon the completion of this examination Mr. Dempsey then answered a question asked some time ago by Commissioner Connell as to what the miners proposed to use in place of docking. Mr. Dempsey then read a brief on this point, discussing all the matters that led up to the conclusion and closing with the substitute for docking which the miners have suggested, which is substantially as follows:

"We suggest that in the matter of loading dirty coal, where it is found that the miner or his laborer has deliberately or carelessly loaded an unreasonable amount of refuse in the car, he shall be subject to such penalty as the colliery grievance committee and the mine foreman may jointly agree upon, which decision shall be final, and that a record of all cars loaded by contract miners will be made at the face of the working places or at the point where they are taken in charge by the company's representative, this rule to apply only where dockage systems are now in effect."

The balance of the afternoon was taken up discussing this point, and Mr. Huber showed that such a system would be nothing but one continued grievance. The commission adjourned at 4 p. m.



W. L. CONNELL, INDEPENDENT COAL OPERATOR

Now on the Anthracite Wage Commission and not only now but for many years chairman of the Anthracite Conciliation Board. Born at Minooka, near Scranton, he has been mayor of that city and is now president of the Connell Anthracite Mining Co.

When the Anthracite Coal Commission met on July 16 to hear the cross-examination of the operators, they probably little realized the difficulties to be confronted. Before the session ended the commission, nettled beyond measure, had been forced into declaring that it thought itself capable of doing long division without help from the mine workers.

Mr. Lauck opened with a question insinuating that Mr. Warriner had attempted to destroy the mine workers' testimony without replacing it with any constructive information. He intimated in his questions that while Mr. Warriner had agreed to the principle of a living wage he had not been as clear as might be wished in defining what a living wage is. Mr. Warriner declared that more than a living wage is now being paid, whereupon Mr. Lauck said, if that were so, why had the operators consented to an increase. Mr. Warriner replied that an increase in cost of living was always conceivable, and the rise in wage was excusable on the ground that the advance in wage would act as an assurance to the mine worker that despite such a change he would have no occasion for apprehension.

Does Minimum Wage Stifle Initiative?

Mr. Lauck asked Mr. Warriner if he believed that a minimum wage was impractical and unsound for the reason that it stifled initiative. Mr. Warriner assented, whereupon Mr. Lauck pointed out that the operators had already granted one of these stultifying minimum wages, namely that of $3.34 per day. Would it stifle initiative if it were raised to $6? Mr. Warriner replied that it would, seeing that a larger number of men than ever would be receiving the minimum wage and there would be no incentive when it was no longer possible to progress from smaller pay to larger.

Mr. Lauck questioned Mr. Warriner to know why, if the differentials were so important, the operators had rendered them less marked by giving flat instead of percentage increases in the three wage advances since 1914. The answer was easy, Mr. Warriner readily explaining that the operators had done it yielding to the pressure of the mine workers and not from any preference for flat increases.

Probably the most important discussion took place in regard to the table of annual earnings as presented by the operators. Both Mr. Murray and Mr. Kennedy made stabs at this table. In the first place they tried to show that a man would have to work more than the 273 days (which the operators themselves had said the mines were in operation) if he hoped to earn the average yearly return as specified by the operators. They took the concrete example of the laborer and showed that he would be required to work 378 days at the minimum of $3.34 per eight-hour day to earn the $1,264 as shown in the table or, granting that the man received the maximum rate of pay for this class of labor, which is $3.67, he would have to work 351 days.

Certain of the Men Work Every Day

Mr. Warriner readily explained this by saying that this table did not presume to show the hours worked, and further that the men had an opportunity to work overtime and so made extra pay, and also that this class of men worked not only when the breaker ran but practically every day of the year. The 273 days of breaker operation had nothing to do with their earnings, and the table was not based on the 273 days worked but on the actual earnings as taken from the company pay sheets.

The mine workers questioned the operators as to their statement relative to the deposits at banks in the anthracite region. Mr. Lauck declared that it included accounts that could in no way be held to belong to the mine workers. This Mr. Warriner conceded, stating that the welfare of the banks was a reflection of the prosperity of the workers in the region's chief industry.

Mr. Lauck endeavored to have Mr. Warriner admit that the rates for other kinds of labor than mining in the anthracite region should not be held of importance in discussing the continuance of the mining rates, because they were so greatly influenced by the mining rates, mining being the dominant industry in the section.

Allentown and Bethlehem Not Mining Towns

Mr. Warriner pointed out that the rates in Allentown and Bethlehem quoted by the operators in their exhibit were no higher than in the anthracite field. It could not be claimed that the wages in those towns were depressed by the low wages in the anthracite field, for they were both entirely removed from the coal regions.

On July 17 the so-called cross examination continued. The mine workers pretended to cross-examine but soon switched off into argument, the noise in the chamber often making it difficult to hear the testimony. The mine workers did their utmost to show that the long-time workers were subject to great mental strain and were liable therefore to brain fag and as a result were apt to endanger the lives of other men. Did not timber and supply hoists also raise and lower men? Did not fan engineers feel every moment the impressive burden of their duties to the men underground as they leaned back in their chairs and watched the progress—of the hands of the clock?

Hazardous and Exciting as Keeping Sheep

Mr. Warriner declared that if the fan stopped the men would note the stoppage of the air and leave the mine. He added that the fan men had little or nothing to do. They could not adjust machinery if it quit running; their duty was simply to keep watch over the machinery, prevent accidents and notify the engineer if the machinery did not run smoothly.

The questioning turned to union recognition, the mine workers asserting that the union members had for eighteen years given their money to benfit the non-union men and were entitled now to the support of all anthracite workers. To that end the union men believed that the right to the check-off should be conceded. Mr. Warriner said that the operators did not object to the union and believed it may have done some good, but they did not feel that one union should be recognized to the exclusion of all others nor that men should be compelled to join against their good will. The operators recognized collective bargaining but did not regard the United Mine Workers of America as sole representatives of their workmen in their mines.

Early last week the mine workers presented their final argument, being followed by the operators.

Mine, Shut Down Over Sunday, Explodes When Power Is Turned On

Shutting Down the Fan Appears to Have Allowed Gas to Accumulate and Explosion Followed the Turning On of Power—Exact Cause of Ignition Is Unknown

By Donald J. Baker
Wilkinsburg, Pa.

ONE of the most disastrous mine explosions of recent years in the Pittsburgh district occurred at 3 a. m. Monday, July 19, at the Renton No. 3 Mine of the Union Collieries Co., located at Renton near Unity, Pa. This disaster cost the lives of nine men.

The No. 3 Mine, which employs about six hundred men, is operating in the Thick Freeport coal of northern Allegheny County and is one of the newer developments of western Pennsylvania, initial construction of the surface plant having been started in 1917. W. R. Calverly, formerly general superintendent of mines for the Berwind-White Coal Mining Co., at Windber, Pa., is general manager of the Union company, which is owned by Pittsburgh interests.

As in many of the younger operations in this district, power is purchased from the West Penn Power Co. When this firm notified the operators of the Renton mine that the current would be off the high-tension lines serving the plant from noon on Saturday, July 17, over the following Sunday in order that needed repairs might be made, all men were withdrawn from the workings.

While the mine has always been considered a gaseous one, it was believed that no great quantity of gas would be generated during the time that the fan was to be shut down, and that no serious trouble would be encountered in re-establishing the circulation of air when the power again became available and the fan should be put in operation.

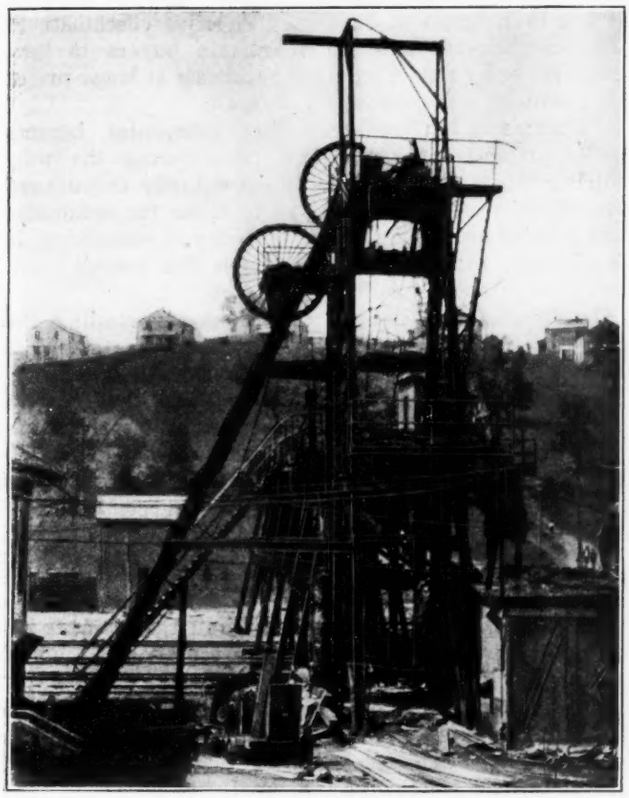
Consequently when power was restored to the line late Sunday evening, the fan was started and the night foreman, firebosses and pumpmen entered the mine to see that the ventilating system was in proper working condition so that the plant might operate on Monday. It had been decided earlier in the evening that the night shift of nearly two hundred men should not be permitted to go below. The inspection force had been in the mine but a short time when Mike Thomas, a lampman on the surface, received a telephone call from John Luteman, the night foreman, informing him that circulation had been established and that the mine was in working condition. It is said that he told Thomas to turn on the power so that the pumps might be put in operation, and that Thomas, did not consider the order from Luteman as being official, and in consequence refused at first to accede to his wishes. Later, however, he was prevailed upon to throw in the switch that controlled the underground sections. The explosion followed immediately.

What actually caused the explosion will probably always remain a mystery. Officials of the Bureau of Mines in charge of the rescue and recovery work think it possible that gas generated during the shutdown of

Fan House

While the building housing the ventilator was considerably damaged, the fan itself escaped unscathed. The work of the rescue parties was aided greatly by early restoration of air circulation.

the fan over Sunday accumulated in large quantities at several points and was ignited when the current was turned on by a short circuit on one of the trolley lines. It is believed that the roof, which is particularly friable, may have come down at some point when the mine was not in operation, carrying the trolley wire with it and bringing it into contact with a rail or other conductor on the floor. While some



EXPLOSIVE FORCE MOST EVIDENT AT AIRSHAFT

The headframe over the airshaft was badly wrecked. Note the broken sheave wheels at the top of the structure. Rails, timbers and girders were thrown up the shaft, among them a 12-in. girder that on its descent pierced the roof of the lamphouse, passed through a brick sidewalk and buried itself in the ground outside the building.

dust may have been ignited, the explosion was primarily one of gas, as no sign could be observed of a coking of the rib such as might be expected if the coal had been subjected to a high temperature.

The men in the mine at the time the gas mixture was ignited, all of whom no doubt were instantly killed, were John Luteman, aged 45, night foreman; Charles Reese, 35, and Edmund Higby, 28, firebosses; Mike Koskurd, 40, supply man; Louis Koffer, 32, and Mike Matuskenoch, 35, timberman; John Marks, 30; Mike Kosta, 40, and Cross DeBlatta, 35, pumpmen. All of these men resided at Renton. Luteman, Higby, Reese and Marks leave families.

Evidence on the surface of the terrific force of the expanding wave was, of course, centered around the main hoisting and air shafts. No serious damage resulted to any of the machinery in the fan house, although the building itself was nearly demolished. The structural steel of the headframe over the airshaft was badly bent and twisted, while the sheave wheels at the top of the structure were broken by rails and timbers ejected from the opening.

Within the main hoisting shaft, which is 517 ft. deep, many guides and buntons were ripped loose. One of the cages was demolished, while the other was blown upward through its compartment with so much force that it became wedged in the top of the headframe. None of the plant buildings entirely escaped damage. Débris blown out of the airshaft did considerable execution. Small pieces of steel, stones and other missiles traveling with high velocity broke window panes as if bullets had struck them. A 12-in. girder was lifted out of the airshaft, in its descent pierced the roof of the lamphouse and passed through a brick sidewalk to bury itself in the ground outside the building.

Below ground the damage wrought was heavy. Apparently every section of the mine received the full force of the explosion, for brattices, overcasts and stoppings were demolished. A 7-ton locomotive at the bottom of the main hoisting shaft was overturned and several mine cars were piled up in one of the shaft compartments. Entrance of rescue crews was made difficult by reason of the damage to the cages and it was necessary for a time to use improvised buckets for lowering the men.

As soon as news of the disaster reached Pittsburgh the Bureau of Mines dispatched a mine-rescue car and several trained men to the scene. Other operations in the immediate vicinity also placed men at the disposal of the Union company. Although the rescue crews were completely equipped with breathing apparatus, it was impossible for them to proceed any great distance from the bottom because of the total wrecking of the ventilation system. Members of some of the rescue parties were overcome with carbon monoxide and had to be brought to the surface to be revived.

Little toward recovering any of the bodies was accomplished by the rescue crews during the first twenty-four hours, it being first necessary to restore the air circulation to some extent. Early Tuesday morning the bruised and burned remains of Matuskenoch was found within 150 ft. of the bottom of the airshaft. Several days elapsed before a complete exploration of all of the workings had been made and the last body had been recovered.

Much credit is due the Bureau of Mine men as well as to the volunteers from other concerns for the rapidity with which the rescue and recovery work progressed. Working for days without sleep, these men often braved death in the hope that some of the unfortunates might be rescued, although it was early realized that small chance existed that any of the men in the mine might have survived. From the condition of the recovered bodies, all of the victims, it is believed, were killed instantly.

Non-Union Men Shot in Williamson Field

WHEN the Freeborn mine of the Portsmouth Solvay Coal Co. was attacked on July 23 by persons hidden in the hills on both the Kentucky and West Virginia sides of the Tug River two mine workers were wounded, and an attempt has been made by the state constabulary to track the murderers with bloodhounds.

The men are said to have been handling coal from the mouth of the mine on the Kentucky side of the river down to the railroad tracks in West Virginia. The assailants were well scattered, there being one party in the West Virginia hills and two in Kentucky. The injuries of one of the workmen are not serious, those of the other are. Guards are said to have returned the fire. Fully 1,000 shots are said to have been fired.

Exchange of Price Data on Trial

Value of Open-Price Bureaus to Coal Industry Unquestioned—Hope Expressed That Government Will Expedite Favorable Change in Laws

THE determination of the Department of Justice to probe minutely into such interchange of price data as may have taken place between members of associations of producers of soft coal again has centered attention on the scope of the anti-trust statutes. It long has been admitted that the anti-trust laws are so vague in many particulars as to work a real hardship on industry.

Disinterested economists point out that the coal industry just now is suffering a variety of growing pains. The relationship of the bituminous coal industry to the public is being worked out on a new basis. It is pointed out that the coal industry is moving rapidly toward an out-and-out classification as a public utility. The last thirty years are referred to as the age of trusts. The steel industry, the petroleum industry and practically all the fundamental industries of the country passed into the trust stage many years ago. This was not true of the coal industry, but its process of knitting together, while retarded, appears now to be in full swing.

It is admitted that competition has been responsible for most of the ills of the coal industry. The reporting of prices on past transactions was an effort to cure some of these ills. The effect is admitted to have been in the interest of the general public. Whether or not the practice came within the technical boundaries of the anti-trust laws remains to be threshed out. The enthusiasm for submitting price reports naturally disappears when prices are high and coal in great demand. Its benefits to the operator are confined almost entirely to periods when the supply is greater than the demand. It has been found to be a very effective checkmate to the reprehensible practice of certain buyers to beat down prices by reporting other purchases at lower prices than actually was the case.

Investments in coal-producing companies became really attractive for the first time during the war. During that time the Government actually encouraged consolidation of interests so as to make for economies and greater production. This tendency to consolidate is continuing, but the extent to which this consolidation has gone is not generally appreciated.

In view of the changed conditions surrounding the coal industry, the activities of the Department of Justice are welcomed in certain quarters in the belief that uncertainty will be eliminated and that certain economic truths will be brought out so clearly as to make possible changes in existing law which will expedite the building up of a coal industry, with due regard to the best principle of efficiency and conservation.

Shipments of Lake Coal by Originating Districts

STATISTICS of the movement of Lake coal to the end of June have recently been compiled by H. M. Griggs, manager of the Lake Erie Ore and Coal Exchange, showing by originating railroads and by ports the record for this year compared with 1919 and 1918. Toledo, Sandusky, Cleveland, Fairport, Erie and Ashtabula have this year made a very poor showing compared with either of the two preceding years. The mines on the Hocking Valley, Toledo & Ohio Central, Baltimore & Ohio, Pennsylvania, Erie and New York Central railroads supply these ports and it has been the failure of shipments from these mines that has been largely responsible for the low rate of movement of Lake coal this year.

Through Huron, Lorain and Conneaut, the Wheeling & Lake Erie, Baltimore & Ohio, and Bessemer & Lake Erie railroads have about equaled their records of 1918 and in the instance of Conneaut exceeded the dumpings of the record year of 1919.

These official figures show 2,069,546 net tons of cargo coal dumped in June of this year, compared with 4,098,828 tons in June, 1919, and 3,363,566 tons in June, 1918. This year to the end of June the tonnage of cargo coal was 3,566,850, as against 8,812,862 tons in 1919 and 7,266,258 tons in 1918.

In his testimony before the Interstate Commerce Commission recently Mr. Groverman, representing the operators of Lake docks, stated that the supply for the American Northwest via the Lakes had been contracted from sixty-one mines on six railroads in five states. The total quantity of bituminous coal under contract by these interests this season is understood to be about 13,550,000 net tons, of which approximately 7,250,000 tons is to come from mines owned by or affiliated with the dock operators, and the remaining 6,300,000 tons has been contracted with producers who have no dock interests. The largest dock interests that are known to have mine connections are M. A. Hanna, Northwestern Fuel Co. (affiliated with the Consolidation Coal Co.), Pittsburgh Coal Co., Berwind Fuel Co. (affiliated with the Berwind-White Coal Mining Co.), Superior Coal & Dock Co., Northern Coal & Dock Co., Pittsburgh & Ashland Coal & Dock Co., Clarkson Coal & Dock Co., Carnegie Coal & Dock Co.

BITUMINOUS COAL LOADED INTO VESSELS AT LAKE PORTS AS DUMPED BY DOCKS
For Season to End of June, in Net Tons

Ports	Railroads	1920 Cargo	1920 Fuel	1920 Total	1919 Cargo	1919 Fuel	1919 Total	1918 Cargo	1918 Fuel	1918 Total
Toledo	Hocking Valley	430,429	6,306	436,735	1,723,987	51,978	1,775,965	1,175,775	35,485	1,211,260
	Toledo & Ohio Central	273,447	18,074	291,521	473,666	13,179	486,845	624,499	18,049	642,548
	Baltimore & Ohio	166,456	7,924	174,380	752,545	16,503	769,048	560,702	8,513	569,215
Sandusky	Pennsylvania	205,543	3,791	209,334	534,094	15,655	549,749	705,597	17,839	723,436
Huron	Wheeling & Lake Erie	538,335	39,157	577,492	697,994	22,451	720,445	632,013	23,522	655,535
Lorain	Baltimore & Ohio	746,049	71,306	817,355	1,208,862	59,492	1,268,354	786,221	24,317	810,538
Cleveland	Pennsylvania	85,741	26,972	112,713	873,302	98,013	971,315	683,277	95,490	778,767
	Erie				70,754	2,481	73,235	234,425	7,129	241,554
Fairport	Baltimore & Ohio				16,692	12,954	29,646	363	13,875	14,238
Ashtabula	New York Central	204,936	59,783	264,719	761,279	48,078	809,357	511,706	65,569	577,275
	Pennsylvania	180,162	30,208	210,370	764,811	30,170	794,981	403,541	24,387	427,928
Conneaut	Bessemer & Lake Erie	709,702	14,033	723,735	534,607	1,755	536,362	713,350	11,865	725,215
Erie	Pennsylvania—West	17,245	932	18,175	300,502	14,055	314,557	179,580	10,792	190,372
	Pennsylvania—East	8,807	26,096	34,903	99,767	4,876	104,643	55,209	1,506	56,715
Totals		3,566,850	304,582	3,871,432	8,812,862	391,640	9,204,502	7,266,258	358,338	7,624,596

Coal Consumed by Electric Power Plants, January-April, 1920

ELECTRIC power produced in the United States during January, February, March, and April, 1920, according to statistics issued by the Geological Survey, required the combustion of coal in net tons is indicated by states in the following table:

	January	February	March	April
Alabama	29,211	17,654	17,819	16,950
Arizona	198	317	271	297
Arkansas	8,675	7,654	8,910	8,095
California	0	0	0	0
Colorado	43,406	39,154	40,545	36,510
Connecticut	75,529	66,497	65,601	51,280
Delaware	9,139	9,834	10,214	10,254
District of Columbia	23,237	21,104	22,171	18,850
Florida	2,333	2,342	2,423	2,204
Georgia	19,556	10,875	10,268	11,856
Idaho	150	60	150	50
Illinois	411,574	384,031	365,716	358,226
Indiana	197,258	184,096	182,537	172,966
Iowa	93,723	89,814	91,063	80,458
Kansas	39,710	36,950	36,422	34,617
Kentucky	43,181	39,521	40,127	38,981
Louisiana	7,589	11,855	12,073	10,665
Maine	8,410	3,523	813	389
Maryland	39,552	34,251	30,391	24,264
Massachusetts	176,514	151,496	142,034	126,161
Michigan	180,157	165,425	169,088	134,759
Minnesota	64,060	56,206	44,144	27,143
Mississippi	14,028	12,887	13,627	10,124
Missouri	91,538	92,867	102,429	96,211
Montana	4,551	4,353	4,276	3,918
Nebraska	37,926	38,939	36,279	34,179
Nevada	247	232	248	229
New Hampshire	6,768	5,780	3,645	3,284
New Jersey	156,280	129,816	134,991	128,338
New Mexico	4,788	4,278	4,675	4,715
New York	480,297	411,500	402,866	348,643
North Carolina	21,612	18,609	20,271	19,013
North Dakota	19,362	16,007	14,266	12,812
Ohio	400,731	361,998	373,329	349,274
Oklahoma	8,413	8,889	9,573	8,694
Oregon	190	197	635	200
Pennylvania	527,198	489,055	502,727	452,623
Rhode Island	35,196	32,624	28,675	25,540
South Carolina	11,649	9,630	11,202	9,347
South Dakota	7,827	7,645	6,522	5,523
Tennessee	24,216	22,486	23,953	23,524
Texas	48,076	46,283	22,820	20,089
Utah	3	15	40	70
Vermont	1,748	2,250	441	261
Virginia	43,269	37,585	33,737	31,740
Washington	3,348	2,722	3,230	3,837
West Virginia	107,133	98,089	106,963	99,359
Wisconsin	77,051	76,734	83,187	68,316
Wyoming	13,718	13,516	13,380	11,249
Total	3,620,325	3,277,645	3,270,767	2,936,087

Urges Careful Loading and Direct Billing To Expedite Coal Production

STRESSING the necessity for co-operation in bringing about more efficient operation of the railroads, Jonas Waffle, secretary of the Indiana Coal Trade Bureau, has sent to members a notice embodying the following suggestions:

Approximately 200,000 cars of bituminous coal are loaded in the United States each week. If the loading of these cars is increased an average of 1,000 pounds per car, a total of 100,000 tons weekly, or 5,200,000 tons annually, additional production can be accomplished with the same number of cars. Mine managers and superintendents should give this problem their undivided attention. Personal supervision of the loading of cars at the mines will result in a substantial increase in production.

Reconsignments slow up the operation of the railroads by reason of extra switching and additional car mileage and accordingly reduce the available supply of cars. You are urged, therefore, to bill all coal from the mines to the ultimate consignee or dealer. Direct billing will enable carriers to utilize the most available routes in movement to destination, which they cannot do on reconsigned cars.

As far as practicable, producers should sell their coal in the territory which normally depends upon their field for its fuel requirements. Shipping of coal to distant points, involving hauls through other coal fields, should be discouraged. The importance of this recommendation is well illustrated by the results obtained from the zoning system in effect under the Fuel Administration. It is admitted by all well-informed coal men that the zoning system "saved the day" during the war, as hundreds of thousands of car miles were saved under that plan. This suggestion, if conscientiously followed in all fields, will furnish each district or zone with the coal it requires and will result in an enormous saving in car miles and a corresponding increase in the supply of cars at the mines.

Shipping clerks should be furnished with a list of the cars at the mines in the order in which they stand on the mine tracks, and in billing cars for various consignees or for various destinations or for movement via various routes, shipping clerks should select the cars so as to reduce to the minimum the amount of switching necessary to be performed by the railroad serving the mine.

While the responsibility for the transportation of coal rests primarily with the carriers, nevertheless it is the duty of producers of coal to do their part in the saving of transportation and we cannot urge upon you too strongly the necessity for your fullest co-operation.

Warrants Issued Against 35 Coal Concerns Charge Violation of Lever Act

CHARGING a violation of the Lever Act in that excessive prices were exacted L. H. Kelly, District Attorney for the Southern District of West Virginia, had warrants issued Saturday, July 17, against thirty-five coal companies operating in southern West Virginia, and their principal officers.

Coincident with the issuance of the warrants the following statement was made by Joseph N. Kenna, Assistant United States Attorney: "The warrants which have been obtained today for violation of the Lever Act in the sale of coal in this district were taken under direct instructions from the Department of Justice. The investigation of the coal situation is being carried forward and additional warrants may be expected at any time that further results of the investigation are deemed to justify them."

What constitutes a fair price for coal has not so far been stated by the District Attorney, although some time ago producers made an effort to learn from the above-named official what he considered a fair price so that they might be within the realm of safety. Therefore what constitutes a legal price and what constitutes an illegal price is considered rather vague. The warrants merely accuse the defendants of unlawfully making an unjust and unreasonable charge in handling and dealing in a necessary, to with, coal.

Companies Served with Warrants

Warrants against the following coal companies were issued:

Clifton Coal Mining Co., Columbia Coal Co., Ivy Branch Coal Co., Anchor Coal Co., Ashford Coal & Coke Co., New Export Coal Co., Superior Thacker Coal Co., Black Betsy Consolidated Coal Co., Eagle Byproducts Coal Co., Blue Ridge Fuel Co., Royal Block Coal Co., Aldridge Coal Co., Colcord Coal Co., Hackett Coal Co., French Coal Mining Co., Lewis Coal Co., West Virginia Coal & Manufacturing Co., Boone County Coal Corporation, Draper Coal Co., Camp Black Coal Co., P. M. C. Coal Co., Falkner Coal Co., Pan Coal Co., The Argyle Coal Co., Cub Fork Coal Co., Buffalo-Eagle Colliery Co., Manbar Coal Co., Peytona Mining Co., Rock Bottom Coal Co., Sterling Block Coal Co., West Virginia Eagle Coal Co., Charleston Co-Operative Coal Co., Mountain Eagle Colliery Co., Barren Creek Coal Co. and James R. Branch Coal Co.

Why Europe Should Not Be Denied Our Coal

No National Policy on Exports Has Been Announced—Government Restriction of Exports of Coal to Europe Considered Unlikely

COMPLYING with a request from the President it is understood that a report by the interdepartmental economic liaison committee has been sent to the White House. The report, it is understood, condemns any important curtailment of the exports of coal. The report is a confidential one and exact information concerning its recommendations is not available. Entirely apart from the humanitarian side of the situation, it is believed that emphasis is placed upon the fact that it is to our selfish domestic interest to do all we can to prevent an economic collapse in any of the countries of Europe, especially those where vast credits have been extended.

Italy requires a minimum of 750,000 tons of coal monthly. She has entered into an agreement with Great Britain for a portion of that tonnage and has asked our State Department to facilitate the obtaining of 350,000 tons per month in the United States. Italy produces practically no coal. Last winter the Italian Government was so strict in its supervision of coal that it prohibited the use of any coal whatever for heating purposes. All coal was reserved for the industries. When exchange is taken into consideration it means that Italian consumers pay from $100 to $125 per ton for American coal. That fact alone is a guarantee that it will not be wasted.

In France the best coal fields were destroyed by the Germans. Great Britain has agreed that 45 per cent of its coal exports are to go to France and it seems probable that France will receive larger supplies from Germany. Nevertheless this country must be relied upon for a certain amount of coal required in the French Republic.

There are almost as many reasons for furnishing Canada with coal as there are for furnishing New England an adequate supply, to say nothing of the fact that coal to Canada spells wood-pulp and news print. In like manner, coal for Cuba spells sugar.

Denmark produces no coal, but is an important producer of food products. Were Denmark to be cut off from American coal it would add materially to the unrest in western Europe, because it would mean a great curtailment in the amount of butter and other dairy products available. Sweden produces 400,000 tons of low-grade coal but must have much more than that for its industries. Next to the United States, Sweden is the largest producer of wood-pulp and paper. American consumers are able to secure these much-needed commodities from Sweden only when payment, or part payment at least, is made in actual coal. The coal shortage is such in Sweden that pulp-wood is being used to fire the mills. The Norwegian situation is almost exactly the same as that of Sweden.

According to advices to the State Department, Germany produced coal during the first five months of 1920 at the rate of 125,000,000 tons annually. When France has been furnished her quota of German-mined coal there is not enough left to go around in Germany. Rationing of industries and of domestic consumers continues.

The east coast of South America is only partly dependent on the United States for coal, but as it is greatly in the interest of every man, woman and child in the United States to hold the market which we have established in those countries there is great demand that our meager exports to South America be not curtailed further. Despite the demand for British coal 80,000 tons monthly has been allotted to South America.

Survey Issues Data on Coal Distribution of Rocky Mountain and Pacific States

IN RESPONSE to urgent requests the U. S. Geological Survey has issued advance statistics of the distribution of coal produced in the Rocky Mountain and Pacific Coast States during the calendar year 1918. The figures are drawn from "Coal in 1918, Part B, Distribution and Consumption," by C. E. Lesher, which is now in press.

The statistics are based in part upon reports submitted to the Geological Survey by the mines, in part upon distribution records kept by the district representatives of the Fuel Administration, and in part upon statistics obtained from the railroads.

It must be remembered that during the last three-fourths of the year 1918 the zones established by the Fuel Administration were in force, a fact which modified the distribution of coal produced in these States.

DISTRIBUTION OF COAL PRODUCED IN THE ROCKY MOUNTAIN AND PACIFIC COAST STATES, 1918 IN NET TONS

Use or destination	New Mexico	Colorado	Utah and Southern Wyoming	Montana and Northern Wyoming	Washington
Used in home State:					
Sold to local trade not shipped	39,000	436,000	119,000	256,000	74,000
Used at mines for steam and heat	40,000	311,000	258,000	266,000	194,000
Made into coke at mines	1,108,000	1,080,000	738,000	.....	155,000
Shipped to points in home State	217,000	4,519,000	1,987,000	1,512,000	1,088,000
Total used in home State	1,404,000	6,346,000	3,102,000	2,034,000	1,511,000
Shipped to other States:					
Arizona	225,000	10,000	.....	.....	.....
California	56,000	6,000	654,000	.....	18,000
Colorado	54,000	.....	17,000	1,000	.....
Idaho	.....	5,000	543,000	21,000	7,000
Iowa	.....	135,000	47,000	236,000	.....
Kansas	78,000	784,000	15,000	1,000	.....
Minnesota	.....	.....	.....	15,000	.....
Missouri	.....	6,000	2,000	14,000	.....
Montana	.....	.....	274,000	.....	.....
Nebraska	.....	1,133,000	344,000	590,000	.....
Nevada	.....	.....	445,000	.....	.....
New Mexico	.....	83,000	.....	.....	.....
North Dakota	.....	.....	.....	154,000	.....
Oklahoma	31,000	145,000	.....	.....	.....
Oregon	.....	.....	267,000	1,000	161,000
South Dakota	.....	30,000	12,000	251,000	.....
Texas	235,000	399,000	.....	.....	.....
Utah	.....	1,000	.....	.....	.....
Washington	.....	.....	157,000	105,000	.....
Wyoming	.....	54,000	.....	.....	.....
Total shipped to other States	679,000	2,791,000	2,777,000	1,389,000	186,000
Delivered to railroads by all-rail routes	1,736,000	3,247,000	5,553,000	4,183,000	1,871,000
Exported by rail	74,000	24,000	.....	.....	20,000
Shipped to tidewater	130,000	.....	70,000	.....	494,000
Total production	4,023,000	12,408,000	11,502,000	7,606,000	4,082,000

Indiana Production Advances Slightly

PRODUCTION of coal at 185 mines in Indiana in the week of July 17 is reported as 462,235 net tons, as compared with 440,933 net tons the week preceding. These mines operated 63.96 per cent of full time, with car shortage responsible for 28.67 per cent of time lost. Of the two other causes contributing to lack of production, mine disability and labor trouble, the latter accounted for only 3.51 per cent of time lost.

Embargoes Will Force Needed Coal to the Northwest and New England

Interstate Commerce Commission Agrees to Plan of Limited Embargoes on Markets Other Than Northwest and New England —Plan Is That Proposed by the Operators and Railroad Officials

PREFERENCE and priority in the supply of cars in the transportation of bituminous coal for the Northwest and for New England will bemade effective in the latest orders of the Interstate Commerce Commission by a system of limited embargoes. Order No. 10 of the commission, issued July 20 and effective on and after July 26, provides for such a system of embargoes on carriers originating Lake coal. This order is the first of the present series in the authorship of which the coal operators have collaborated.

Order No. 10 is, of course, a real priority order. Whatever coal is needed for the Northwest must now be shipped before any other consignee can be supplied with coal from these fields. Compared with Judge Lovett's Priority Order No. 1, of August, 1917, this would appear to be less severe. Judge Lovett's order provided that every empty car furnished a mine must be loaded for the Lakes. All other business was thus technically embargoed by the assignment of the cars to the one trade. The order that this season will be depended on to accomplish the same purpose will operate in much the same manner, with the important exception that not all the cars placed at the mines *must* be loaded for the Lakes. Order No. 10 provides that after a certain percentage of each day's loading has been billed to the Lakes the remainder may be shipped elsewhere. The percentage for each originating field is to be determined by H. M. Griggs, manager of the Ore and Coal Exchange, who has been appointed a special agent of the commission for this purpose. The several percentages are subject to change on one day's notice.

Program Has Difficult Features

The proper determination of the percentages of the loading in each field that must first be consigned to the Lakes each day is at once the most difficult and the most important feature of the program. It is obvious that the portion that is forced to the Lakes must not be greater than is absolutely required, by reason of the general condition of short supply and urgent demand for coal elsewhere, a demand that is largely responsible for the shortage in the Lake movement which this order is to correct. The proper determination of these percentages involves also a knowledge of the number of assigned cars in each field, for these are excepted from the order, and must involve also an estimate of the extent to which shippers will provide coal over and above the required amount. It appears that however carefully the first figures may be worked out frequent changes will be necessary in the earlier stages.

It is well to reflect that the Lovett order was a 100-per cent assigned-car order for the Lakes and that up to July 1 of that year (1917) there had been dumped at Lake Erie 6,329,600 tons of coal, compared with but 3,871,432 tons this year in the same period. If from about the middle of August to the close of navigation in 1917 the percentage of loading from each field was 100 for Lake, in order to get a total of less than 27,000,000 tons moved in the season, and if the new order this year starts under a handicap of 2,500,000 tons, what percentage will be required under Order No. 10 to get the desired 30,000,000 tons up the Lakes this season, production at the present time being at about the rate of 1917?

Although the plan avoids the use of the term "assigned cars" in describing the procedure it is obvious that up to the determined amounts the cars supplied each mine are actually assigned. The division is made equal and in this way the great objection of the coal operators to assigned cars—unequal running time—is overcome. In effect Order No. 10 operates as did the orders of the distribution division of the Fuel Administration to the district representatives; as, for instance, when Cameron was directed to supply 3,500 cars per week to New England, or Hurd and McKinney to increase shipments to the Lake by 1,000 cars per week. Lacking a district representative to whom the shippers are responsible recourse has been had to the railroads, which are responsible to the Interstate Commerce Commission. Lacking authority over the operators, the operators have imposed regulation over themselves through the only possible agency.

The scheme will not work unless the coal is bought. The railroads may take definite portions of each day's loading from the mines to either the Lake or Tidewater pools, but if the interests at the head of the Lakes or in New England cannot agree on terms of purchase, the terminal ports will soon become congested and they in turn embargoed. It is highly important, therefore, that the operator of *every* mine be approached by buyers for the Northwest and for New England and that all the coal that will be forced into these markets be bought before it reaches the boats. Already there are rumors that speculators will attempt to take advantage of the situation by buying the coal that is to be forcefully diverted to these two markets.

Text of Service Order No. 10

It appearing in the opinion of the commission that because of a shortage of equipment and congestion of traffic, aggravated by unfavorable labor conditions which continue to exist upon the lines of each and all the common carriers by railroad subject to the Interstate Commerce Act within the territory east of the Mississippi River, and because of the inability of the said common carriers properly and completely to serve the public in the transportation of coal, an emergency exists which requires immediate action; and

It further appearing that the people in the territory comprising the states of Michigan (upper peninsula), Wisconsin, Minnesota, North Dakota, South Dakota, Montana and Canada are in a large measure dependent upon bituminous coal, which must be transported from mines in Pennsylvania, Ohio, West Virgina, Virginia and Kentucky to the said territory by rail and lake during the season of Lake navigation ending about Nov. 1 each year;

It further appearing that the rate at which coal has been and is now being transported to the said territory by rail and lake is not sufficient to meet its requirements or to assure peace, health and welfare to the people thereof,

It is ordered that until the further order of this commission (the following railroads):

Baltimore & Ohio Railroad Co. from coal mines west of Grafton, W. Va., and Meyersdale, Pa.
Pennsylvania Railroad Co. and Pennsylvania Railroad Co., Western Lines, from coal mines on main and branch lines west of Latrobe, Pa.
New York Central Railroad Co. from coal mines in the state of Ohio.
Louisville & Nashville Railroad Co. from coal mines on and east of the line from Cincinnati, Ohio, to Jellico, Tenn.
Wheeling & Lake Erie Railway Co.
Hocking Valley Railway Co.
Toledo & Ohio Central Railway Co.
Pittsburgh & West Virginia Railway Co.
West Side Belt Railroad Co.
Bessemer & Lake Erie Railroad Co.
Pittsburgh & Lake Erie Railroad Co.
Pittsburgh, Chartiers & Youghiogheny Railway Co.
Montour Railroad Co.
Monongahela Railway Co.
Kanawha & Michigan Railway Co.
Chesapeake & Ohio Railway Co.
Norfolk & Western Railway Co.
Coal & Coke Railway Co.
Union Railroad Co. (Pennsylvania).
Sandy Valley & Elkhorn Railway Co.
Pittsburgh, McKeesport & Youghiogheny Railway Co.
Kanawha & West Virginia Railroad Co.
Long Fork Railway,

each of which is a common carrier by railroad subject to the Interstate Commerce Act, be, and they are hereby, authorized and directed to give preference and priority in the supply of cars for and in the transportation of bituminous coal consigned to the Ore & Coal Exchange (the address of which is Perry Payne Building, Cleveland, Ohio) at any Lake Erie port for transshipment by water as a part of a pool or pools of lake cargo or bunkerage coal at any such port; and to place an embargo on the supply of cars for or the movement of all other bituminous coal in carloads to any other consignee or destination;

Provided that this order shall not apply to coal loaded in cars furnished, placed or assigned under any order or direction hereinbefore or hereafter entered by the commission; *and provided further* that after a producer and shipper of bituminous coal served by any of said common carriers in the said territories has on any day shipped to the said Ore & Coal Exchange at any of the said ports a percentage (to be determined and announced for each coal producing district by H. M. Griggs, manager of said Ore & Coal Exchange, who is hereby designated as an agent of the commission therefor) of the total number of cars to which the shipper is entitled on the said day, then this embargo shall not apply to the said shipper for the remainder of the said day to ship the remainder of the cars to which he is entitled to any consignee and destination he may desire, including the said Ore & Coal Exchange and the said Lake ports.

It is further ordered that bituminous coal in carloads consigned to the said Ore & Coal Exchange up to the percentage hereinbefore referred to shall not be subject to reconsignment except upon a permit and direction therefor issued by the said H. M. Griggs, who is hereby designated as an agent of the commission therefor, which permit and direction shall be issued by him only upon a showing that the coal so to be reconsigned will go to a Lake pool or pools.

It is further ordered that the percentages hereinbefore referred to shall be subject to change from time to time by the said H. M. Griggs upon one day's notice to the carrier or carriers concerned.

It is further ordered that this order shall be effective on and after July 26, 1920, until the further order of the commission.

And it is further ordered that copies of this order be served upon the carriers hereinbefore described, and that notice of this order be given to the general public by depositing a copy hereof in the office of the secretary of the commission at Washington, D. C.

Senator Calder Starts Coal Investigation

CONSTRUCTION and building interests are believed to be behind the public investigation of the coal situation now being conducted in New York City by Senator William M. Calder, of Brooklyn. These interests are openly opposed to the policy of the Interstate Commerce Commission in giving preference to coal in the use of open-top cars, as expressed in orders Nos. 7 and 9.

This was strikingly brought out by Senator Calder in his examination of Mr. Storrow by questions and answers designed to show that Order No. 7 had been of no assistance to New England in obtaining coal. This line of reasoning was satisfactory to both Senator Calder and Mr. Storrow, because Mr. Storrow is maintaining that the only important obstacle to New England getting water-borne coal is foreign exports.

Mr. Storrow declared that restriction of exports should have been put into effect by the Interstate Commerce Commission before it had issued such a drastic order as the open-top order. He added that the "skyrocketing of coal prices" was caused by excessive and unrestricted exports of coal. These prices, he said, began to go up when exports suddenly doubled in April.

Mr. Storrow believes that a reasonable restriction of coal exports would tend to bring coal prices back to normal and put a stop to profiteering, although more activity by the Department of Justice also might have a good effect.

At the hearing on Wednesday, July 21, G. F. McGee, State Fuel Administrator of Minnesota, said the present bituminous situation was due to bad car supply and not to the exporting of coal. He said the mines were getting only about 35 per cent of the cars needed. Mr. McGee said that giving the Northwest priority coal shipments would settle the problems there, and that it might not be a bad thing to halt coal shipments to Europe for a time.

William H. Groverman, secretary of the Northwestern Coal and Dock Operators' Association, another witness, said that he is the author of Order No. 10, issued by the Interstate Commerce Commission. He declared a coal car should be designated and then every car should be used in carrying coal. If this is done, he said, we will have plenty of coal for the country and for export. Mr. Groverman could not see that the placing of an embargo on exports was going to solve the problem.

The fuel requirements of the public utility corporations in New York City were rehearsed before the committee at its hearing on July 23. John W. Lieb, vice-president of the New York Edison Co., stated that about 5,000,000 tons of anthracite and bituminous coal were consumed annually by the local corporations. At a conservative estimate, he said, owing to the necessity to purchase spot coal, the coal bill of the various corporations is running from $7,000,000 to $8,000,000 in excess of its normal amount.

Coal for Export Is Now Sold F.O.B.

REPORTS reaching officials in Washington are to the effect that the practice of making sales of coal on a c.i.f. basis has practically stopped, because of the delays and uncertainties occasioned by embargoes and regulations. As a result, it is stated, nearly all export coal is being sold f.o.b. at tidewater, leaving to the foreign purchasers the burden of the further handling of the coal.

Bituminous Costs and Realizations in Middle Appalachian Field

Federal Trade Commission Report Gives Data for Maryland, West Virginia and Virginia, Representing 18 Per Cent of U. S. Soft Coal Output—Average Cost, $1.63 to $3.09; Sales Return, $2.45 to $2.88 Per Ton

COAL produced in Maryland, West Virginia and Virginia represents about 18 per cent of the total soft coal of the United States. The Federal Trade Commission has just published a report covering the costs of production and sales realization from operations in these states for the year 1918 with comparable figures for a substantial portion of the operations for the years 1916 and 1917. This report is No. 6 of the series of cost reports the commission is publishing based on the data collected during the war for the Fuel Administration and used as a basis of scientifically regulating prices. The preceding reports, covering the more important bituminous fields in the East and Middle West and the anthracite field of Pennsylvania, have previously been reviewed in *Coal Age*. All operations for which complete reports were received for the year 1918 are included in the report and their output represents about 68 per cent of the total for Maryland, 89 per cent for West Virginia and 77 per cent for Virginia.

For these operations, at which was produced 90,169,992 net tons of coal, the average annual total f.o.b. mine cost ranged by districts from $1.63 to $3.09, and the average sales realization from $2.45 to $2.88 per ton.

The costs by quarters in 1918 and for the year, by districts, together with sales realization and resultant margins are contained in the accompanying tables.

TABLE I. COSTS AND SALES REALIZATIONS OF MARYLAND AND WEST VIRGINIA IN 1918

Period (1918)	Costs per Ton: Labor	Supplies	General Expense	Total F.O.B. Mine	Sales Realization per Ton	Margin per Ton
Upper Potomac, Cumberland-Piedmont District:						
January-March	$1.73	$0.26	$0.33	$2.32	$2.92	$0.60
April-June	1.74	.26	.33	2.33	2.84	.51
July-September	1.73	.25	.31	2.29	2.77	.48
October-December	1.90	.32	.39	2.61	2.77	.16
Year	$1.77	$0.26	$0.34	$2.37	$2.82	$0.45
Production for year, 6,855,916 tons.						
Pocahontas District:						
January-March	$1.07	$0.22	$0.29	$1.58	$2.67	$1.09
April-June	1.04	.24	.27	1.55	2.45	.90
July-September	1.08	.25	.27	1.60	2.35	.75
October-December	1.18	.30	.31	1.79	2.35	.56
Year	$1.09	$0.26	$0.28	$1.63	$2.45	$0.82
Production for year, 18,461,200 tons.						
Tug River District:						
January-March	$1.41	$0.24	$0.34	$1.99	$2.71	$0.72
April-June	1.43	.27	.33	2.03	2.73	.70
July-September	1.52	.31	.32	2.15	2.72	.57
October-December	1.66	.35	.37	2.38	2.71	.33
Year	$1.50	$0.29	$0.34	$2.13	$2.72	$0.59
Production for year, 2,895,664 tons.						
Thacker District:						
January-March	$1.25	$0.27	$0.31	$1.83	$2.91	$1.08
April-June	1.23	.30	.31	1.84	2.82	.98
July-September	1.31	.32	.29	1.92	2.64	.72
October-December	1.44	.41	.36	2.21	2.65	.44
Year	$1.30	$0.32	$0.32	$1.94	$2.76	$0 82
Production for year, 2,879,528 tons.						
Kenova District:						
January-March	$1.53	$0.23	$0.40	$2.16	$2.94	$0.78
April-June	1.63	.18	.43	2.24	2.89	.65
July-September	1.77	.15	.39	2.31	2.76	.45
October-December	2.08	.18	.54	2.80	2.89	.09
Year	$1.72	$0.18	$0.43	$2.33	$2.87	$0.54
Production for year, 421,602 tons.						
Logan District:						
January-March	$1.10	$0.22	$0.34	$1.66	$2.86	$1.20
April-June	1.04	.21	.31	1.56	2.69	1.13
July-September	1.13	.26	.30	1.69	2.56	.87
October-December	1.27	.35	.37	1.99	2.51	.52
Year	$1.13	$0.26	$0.33	$1.72	$2.64	$0.92
Production for year, 8,555,680 tons.						
New River District:						
January-March	$1.46	$0.28	$0.36	$2.10	$2.95	$0 85
April-June	1.41	.28	.36	2.05	2.90	.85
July-September	1.47	.31	.35	2.13	2.82	.69
October-December	1.58	.40	.42	2.40	2.84	.44
Year	$1.48	$0.31	$0.37	$2.16	$2.88	$0.72
Production for year, 13,257,162 tons.						
Kanawha District:						
January-March	$1.41	$0.22	$0.32	$1.95	$2.66	$0.71
April-June	1.32	.23	.27	1.82	2.60	.78
July-September	1.35	.23	.26	1.84	2.60	.76
October-December	1.44	.31	.32	2.07	2.56	.49
Year	$1.37	$0.25	$0.29	$1.91	$2.60	$0.69
Production for year, 9,717,073 tons.						
Putnam County District:						
January-March	$2.29	$0.45	$0.46	$3.20	$2.37	[1] 83
April-June	2.15	.30	.36	2.81	2.86	.05
July-September	2.28	.41	.40	3.09	2.90	[1] 19
October-December	2.40	.50	.50	3.40	2.87	[1] 53
Year	$2.27	$0.40	$0.42	$3.09	$2.76	[1] $0.33
Production for year, 218,453 tons.						
Mason County District:						
January-March	$1.74	$0.27	$0.30	$2.31	$2.52	$0.21
April-June	1.77	.29	.30	2.36	2.78	.42
July-September	1.68	.26	.28	2.22	2.84	.62
October-December	1.75	.41	.37	2.53	2.81	.28
Year	$1.74	$0.30	$0.31	$2.35	$2.74	$0.39
Production for year, 104,500 tons.						
No. 10 District:[2]						
January-March	$1.35	$0.24	$0.33	$1.92	$2.51	$0.59
April-June	1.31	.23	.30	1.84	2.59	.75
July-September	1.37	.24	.28	1.89	2.64	.75
October-December	1.50	.27	.33	2.10	2.62	.52
Year	$1.38	$0.25	$0.30	$1.93	$2.59	$0.66
Production for year, 4,421,647 tons.						
Fairmont District:						
January-March	$1.40	$0.27	$0.37	$2.04	$2.69	$0.65
April-June	1.26	.25	.33	1.84	2.66	.82
July-September	1.32	.25	.31	1.88	2.52	.64
October-December	1.43	.31	.37	2.11	2.51	.40
Year	$1.35	$0.27	$0.34	$1.96	$2.59	$0.63
Production for year, 11,427,803 tons.						
Pittsburgh Seam District:						
January-March	$1.52	$0.27	$0.26	$2.05	$2.76	$.71
April-June	1.43	.26	.23	1.92	2.55	.63
July-Sepzember	1.47	.28	.22	1.97	2.49	.52
October-December	1.52	.34	.27	2.13	2.43	.30
Year	$1.48	$0.29	$0.24	$2.01	$2.55	$0.54
Production for year, 3,077,779 tons.						

[1] Amount by which total f. o. b. mine cost exceeded sales realization.
[2] No. 10, Coal and Coke and Gauley districts (combined).

Period (1918)	Costs per Ton — Labor	Supplies	General Expense	Total F.O.B. Mine	Sales Realization per Ton	Margin per Ton
District No. 3:						
January-March	$1.68	$0.27	$0.38	$2.33	$2.74	$0.41
April-June	1.73	.26	.38	2.37	2.92	.55
July-September	1.82	.26	.35	2.43	2.83	.40
October-December	2.06	.37	.46	2.89	2.71	1.18
Year	$1.81	$0.28	$0.39	$2.48	$2.81	$0.33
Production for year, 456,095 tons.						
District No. 5:						
January-March	$1.22	$0.30	$0.28	$1.80	$2.61	$0.81
April-June	1.23	.37	.29	1.89	2.61	.72
July-September	1.27	.35	.28	1.90	2.56	.66
October-December	1.36	.44	.34	2.14	2.56	.42
Year	$1.26	$0.37	$0.30	$1.93	$2.58	$0.65
Production for year, 7,419,890 tons.						

Illinois Miners Strike Against Commission's Award

Practically All Illinois Mines Are Idle—Daymen Want More Than Contract Provides—Operators Repudiate ' Tacit Agreement"

OF THE 375 mines in Illinois, 363 are idle, and those that are working are small and their output negligible. The day workers are determined that they shall have an increase larger instead of smaller than was conceded to the contract miners, wholly overlooking the fact that during the war it was the day workers who got the more liberal advances. They want a flat increase of $2 per day. Where the surface daymen were receiving $5.30 they want $7.30. Underground workers who are paid $6 per day want $8. They contend that as they have not been working steadily they have not had a living wage.

E. C. Searles, president of the Illinois Coal Operators' Association, has been in Washington representing the facts of the situation to the President. The operators deny the assertion recently made by union officials that they would be willing to increase wages if the Government would permit it, and they also declare that it is not true, as alleged, that they have reached a "tacit agreement that if a strike must come this would be the best time for it rather than in the winter." They declare that they are anxious to have the mines working at full capacity, feeling that any cessation of work coming on top of the serious lack of car supply must have serious consequences in curtailing the production of coal so badly needed.

In their letter to the President on July 19 they relate the fact that on March 31 they entered into an agreement with the scale committee of the union in accordance with the recommendations of the U. S. Bituminous Coal Commission in its award of March 10, and that subsequently an agreement was made with the mine workers in accord with that made with the scale committee. They state that the officials recently requested that a new agreement be made giving larger wage rates. A meeting was held July 14 and 15 at which representatives of the mine workers and of all three operators' associations were present.

The mine workers insisted that "the operators must agree to change our [the mine workers'] present wage agreements so as to give all shift hands and monthly men a much higher wage than it now paid and that the penalty clause in the agreement must be changed so as to remove its present automatic feature." They also "made it clear that black powder and permissible explosives must be furnished at a price that is reasonable and satisfactory to the mine workers of Illinois."

These demands are quoted from the letter of July 16 addressed by Frank Farrington, president; Harry Fishwick, vice-president; and Walter Nesbit, secretary-treasurer, to the officers and members of district No. 12 (Illinois), which letter is quoted by the operators. This same letter ends with these significant words: "In just what direction our efforts will take us or just what means we may have to employ we cannot now say, but we are determined, injunctions and indictments notwithstanding, to use every power and influence at our command to secure their attainment."

Four local unions, of which that at Pana is one, have demanded also time and a half for overtime and double time for Sundays and holidays. The operators are endeavoring to have President Wilson make a statement that will make the Illinois mine workers realize the impropriety and the evil consequences of their demand. International President Lewis of the United Mine Workers has declared that if the case is reopened for the Illinois men it will be necessary to open it for all the Central Competitive Region, embracing 210,000 men. For that matter the effect will be far more widespread, as the Central Competitive contract is the basis of all other coal wage contracts and a re-opening of the wage question in the mines would be a signal for a similar development in other industries.

Wage Advances Increased Cost of Coal In April

COSTS of production of bituminous coal in April were $2.74 per ton, an increase of 36c. compared with costs in the first three months of the year, according to the reports of 590 soft coal operators whose figures are included in a report just issued by the Federal Trade Commission. This report, which covers the month of April, contains data on production, sales realization and costs of production of 812 operators who produced about 23 per cent of the total output in that month. The average cost of production at these operations was $2.76 and the average sales realization was $3.26 per ton, showing an average realization of 50c. per ton, which compares favorably with that during the war year.

Of the total cost of $2.76 labor received $2.04, supplies cost 31c. and general expenses were 41c., leaving 50c. per ton out of which the operator must pay selling expenses, interest on investment and some other items before the amount per ton available for income and excess profit taxes, dividends or surplus can be ascertained.

Comparing the results at the 767 operations for which comparable reports for April and the first quarter of the year are available, the commission notes that the average working time was sixteen days in April, compared with an average of eighteen days in the three months preceding. The sales realization, the cost of the coal to the consumer, providing no jobber intervened, increased from $2.77 per ton in the first three months to $3.30 in April, so that though the mine cost increased

from $2.38 to $2.74 the resultant margin of these operators increased from 39c. per ton in the first quarter of the year to 56c. in April. The increase in cost of operation at the mines of 590 producers in April, 1920, over 1918 was 31 per cent, while their production in April fell 23 per cent below their average output in the year 1918.

The increase in total mining cost of the 590 operators in April as compared with the first quarter of 1920 and with the average for 1918 is explained as chiefly due to two causes: (1) decreased production in April as compared with the other two periods, and (2) the two awards increasing the wages of mining labor, one of 14 per cent effective in November, 1919, and in force throughout the first quarter of 1920; the other of 27 per cent (including the previous 14-per cent advance) effective April 1, 1920.

The bulletin concludes from a tabulation of those operators whose costs were least affected by changes in production that the probable increase in April total costs due to wage advances since 1918 was about 47c. per ton, or 22 per cent.

The average sales realizations, total reported f.o.b. mine costs, and margins per ton of 2,000 pounds of the entire 812 operators covered for April are shown by states, as follows, together with the number of operators reporting in each district.

State and District	No. of Operators	Sales Realization	Reported F.o.b. Cost	Margin (1)
Alabama	43	$3.47	$3.10	$0.37
Arkansas	18	5.21	5.59	(a) 0.38
Colorado	35	3.27	2.86	0.41
Illinois	76	2.75	2.38	.37
Indiana	46	2.80	2.55	.25
Iowa	16	3.67	3.32	.35
Kansas	17	3.75	3.39	.36
Kentucky	75	2.99	2.72	.27
Maryland, b Michigan and Missouri	24	3.58	3.40	.18
Montana	8	3.05	2.76	.29
New Mexico	6	3.57	2.93	.64
Ohio	85	3.48	2.69	.79
Oklahoma	22	4.26	4.25	.01
Pennsylvania	186	3.54	2.76	.78
Tennessee	20	3.45	3.02	.43
Texas	18	2.07	1.97	.10
Utah	7	3.01	2.98	.03
Virginia	7	3.13	2.62	.51
Washington	5	3.39	2.81	.58
West Virginia	75	3.50	2.51	.99
Wyoming	8	2.92	2.53	.39
United States	812	3.26	2.76	.50

(1) "Margin" is not the same as profit.
(a) Amount by which total f. o. b. cost exceeded sales realization.
(b) Includes Upper Potomac, Cumberland and Piedmont district of Maryland and West Virginia.

These figures of costs in April will be published in *Coal Age* next week in greater detail.

New England Shipments Increase

SHIPMENTS of bituminous coal to New England in the first three weeks of July were above those in the corresponding period of June. According to the Geological Survey the movement through the five important rail gateways in the three weeks ended July 17 was 17,392 cars, compared with 10,269 cars in the three weeks ended June 19. The dumpings at Hampton Roads for New England this month to date are reported to be about 10 per cent above those in the same period of June, although the actual figures have not been released.

June Exports of Coal by Tidewater Pass Two Million Mark

EXPORTS of bituminous coal from the Atlantic seaboard in June reached the total of 2,175,000 net tons, a new high record and one that probably is in excess of exports from Great Britain in the same period. The figures for Great Britain are not yet available, but it will be recalled that early in June a restriction to 1,960,000 net tons (1,750,000 gross tons) was decreed by the English government. Of the total exported 1,266,000 tons were dumped at Hampton Roads, an increase over 1,120,000 tons in May. Of the total gain in dumpings of 233,000 tons 146,000 tons were at Hampton Roads.

Total coal dumped at these ports in June was 4,699,000 tons, a gain of 263,000 net tons. All but 30,000 tons of this increase went to exports. New England dumpings dropped from 776,000 net tons in May to 772,000 tons in June, while the quantity dumped for bunkers and for local use, as at New York Harbor, increased 34,000 tons.

According to F. G. Tyron, of the U. S. Geological Survey, shipments of bituminous coal to tidewater during June were the largest in any month of record. The total dumped at the four North Atlantic ports and Charleston (4,699,000 net tons) was an increase over October, 1919—hitherto the maximum month—of 102,000 tons.

TIDEWATER BITUMINOUS COAL SHIPMENTS TO THE FOUR NORTH ATLANTIC PORTS AND CHARLESTON
(Figures in Net Tons)

	Coastwise to New England	Exports	All Other (a)	Total Dumped at Tide
1918-Total for year	15,248,000	3,740,000	23,921,000	42,909,000
1918-Monthly average	1,271,000	312,000	1,993,000	3,576,000
1919-Total for year	8,385,000	8,291,000	20,386,000	37,062,000
1919-Monthly average	699,000	691,000	1,699,000	3,089,000
1920-January	804,000	897,000	1,484,000	3,185,000
February	793,000	718,000	1,388,000	2,899,000
March	954,000	1,033,000	1,978,000	3,965,000
April	717,000	1,903,000	1,436,000	4,056,000
May	776,000	1,942,000	1,718,000	4,436,000
June	772,000	2,175,000	1,752,000	4,699,000
Total first six months of 1920	4,816,000	8,668,000	9,756,000	23,240,000
Monthly average to to date	803,000	1,445,000	1,626,000	3,873,000

(a) Includes bunker, inside capes, and other local and coastwise tonnage.

The record for the month shows little change in the relative proportions of the New England and export movement. Service Order No. 6 did not go into effect until June 24, so that the month's performance can not be regarded as a test of the effectiveness of that order.

By ports, the shipments were as follows:

TIDEWATER BITUMINOUS COAL SHIPMENTS, JUNE, 1920, BY PORTS
(Net Tons)

Port	Coastwise to New England	Exports	All Other(a)	Total Dumped at Tide
New York	.....	.....	968,573	1,145,563
Philadelphia	176,990	226,483	158,345	454,415
Baltimore	69,587	605,296	193,498	837,845
Hampton Roads	486,809	1,266,534	422,223	2,175,566
Charleston	.....	76,486	8,985	85,471
Total	772,437	2,174,799	1,751,624	4,698,860

(a) Includes bunker, inside capes, and other local and coastwise tonnage.

Connellsville Region Ordered to Ship 300,000 Tons to Northwest

WITH more buyers than can be supplied willing to pay up to $12.25 at the mines for bituminous coal, operators in the Connellsville region received an arbitrary order to consign a total of 300,000 tons to the Northwest market, commencing Monday, July 26, under the terms of Service Order No. 10, with no provision made in advance as to price. Authority to enforce the order was given by the Interstate Commerce Commission to H. M. Griggs, manager of the Ore & Coal Exchange, Cleveland, and he has issued an announcement at Uniontown, Pa., that the region's allotment was 300,000 tons, of which 175,000 will be contributed by mines along the Monongahela R.R.

Canada Embargoes Exports

FOLLOWING a conference between members of the Interstate Commerce Commission with F. B. Carvell, chief commissioner of the Canadian Railway Board, the latter board has declared an embargo on exports of coal from the Atlantic or St. Lawrence River ports of Canada, except to the United States or Newfoundland. This step was taken to carry out an agreement on the part of the Canadian representatives to take all advisable steps to conserve fuel in Canada.

Opposition in the region to Order 10 is found in the fact that rates in the Lake market are at least $4 below prevailing prices here, and, inasmuch as the order to ship coal is mandatory, it would seem unreasonable that Lake consumers would voluntarily raise the price level. Six dollars is held to be a big price for coal in the Lake market and $8.50 per ton is the highest figure it has reached even in the present activity. When compared with the $11.50, $12 and up to $12.25 being received daily by operators at Uniontown their view of Order No. 10 can be readily appreciated.

The Monogahela R.R. has notified shippers that to enforce the order it will require 30 per cent of car rating, less certain provisions, to be consigned to the Great Lakes market before shipments will be moved to any other destination. Railroad fuel, priorities under Order No. 9 and individual cars are excepted from the ruling. The car placement for the Monongahela is now just a little better than 30 per cent, and any mine which does not ship to any of the priorities, it would appear, must consign its entire output to the Cleveland pool with no understanding about price and the consumers holding the whip hand.

Still Shooting Up Non-Union Men Along The Tug River

FOR the second time within a week or so striking miners concealed in the woods on the West Virginia side of Tug River fired several volleys at the tipple of the Borderland Coal Co. on the Kentucky side of the river at Borderland on Tuesday, July 13. Men on guard on the Kentucky side promptly returned the fire. There were no casualties, so far as could be learned. A number of deputy sheriffs were sent to the scene of the firing, but when they arrived those who had been firing across the river had escaped.

Within a few days after the shooting across Tug River a large detachment of state police was ordered into Mingo County by Governor Cornwell to preserve order and to prevent further clashes. Governor Morrow of Kentucky, it is learned, has asked the Governor of West Virginia to prevent further firing across the river into Kentucky.

Some of the larger companies in the Williamson field resumed operations on Tuesday, July 20. The fact that they were to attempt a resumption of operations was carefully guarded, but it became known in advance to some of the strikers, for the same tactics employed at Borderland upon two occasions were attempted near Thacker, in the Williamson field, on Monday, July 19, fully two hundred shots in all being fired. As on previous occasions the striking miners, secreted on a hillside, opened fire on the plant in order to deter the miners not on strike from going to work.

While up until Tuesday, July 20, forty-two of the seventy-three mining operations in the Thacker district had suspended operations and had settled down apparently to a test of endurance, the attempt was made as stated to resume operations at some points on July 21. The companies which have suspended operations are for the most part located on the main line of the Norfolk & Western R.R. between Iaeger and Williamson. Lathrop and Panther, although in McDowell County, are classed as being in the Williamson field, yet at last accounts they were operating at full tilt. So far only one company in the Pond Creek field has suspended operations.

Owing to this further evidence of disturbance, Governor Cornwell left Charleston Monday night for a personal inspection of conditions in the field, being preceded by Colonel Jackson Arnold, head of the state police, who now has the maximum strength of his force in Mingo County keeping order. Governor Cornwell is expected to stay a day or more in the Williamson field.

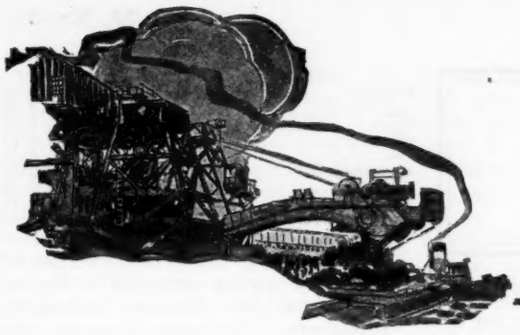
At the same time the Governor of the State of Kentucky has decided to call out the militia and use it to protect the border along Tug River, which separates Pike County, Kentucky, from Mingo County, West Virginia. In order to get the men into place rapidly it will be necessary to transport them through West Virginia, via Williamson, Mingo County, as otherwise it would be necessary to march them a distance of twenty-five to fifty miles. Governor Cornwell has given permission for this transference of troops on the soil of West Virginia.

Goodrich Bill to Regulate Indiana Coal Passes State Senate

THE administration bill to regulate the price and distribution of coal in Indiana was passed by the Senate in the special session of the Legislature July 23 and now is being considered by a joint committee of both the House and Senate before being put up on the floor of the House. The bill as passed by the Senate by a vote of 27 to 12 eliminated many features incorporated in the House bill that was passed about a week ago. (See page 243, this issue.)

Among other things, the Senate refused to authorize the creation of a new commission of three members to regulate the coal industry and delegated such powers to the Public Service Commission. A section pertaining to the seizure of coal mines which was omitted from the House bill and adopted by the lower house by mistake was not included in the measure by the Senate. Political leaders look for the House to agree on the changes made by the Senate.

As the bill now stands the work of administering the law will fall on the Pubilc Service Commission, a duty that is being sidestepped by the commission on the plea of too much work.



Production and the Market

Weekly Review

Hopeful Conditions Resulting from Gains in Production Offset by Strike in Illinois—Movement to Lakes Not Gaining as Fast as Desired—Exports Set New High Mark—Prices Show No Recession and Gain in Some Sections

PRODUCTION of bituminous coal in the third week of July nearly reached the 11,000,000-ton mark. Preliminary reports for the week of the 24th indicate no great improvement; in fact, with the strike in Illinois a decrease may result. That the strike if not of long duration may not have serious effects is indicated by data in the recent weekly report of the Geological Survey which shows that the field comprising Illinois, Indiana and western Kentucky has already this year produced 102 per cent of the record of 1917 and within 4 per cent of that of the war year, 1918.

These figures also show that the large Eastern fields, Virginia and north, are 14 per cent behind 1918 and 10 per cent behind 1917. The present coal shortage is therefore shown to be largely localized in the large Eastern territory. It is from the coal fields in this region that the large exports to Europe are coming and it is from these same fields that extra coal for the Northwest and New England is to be provided under the latest orders of the Interstate Commerce Commission. When these orders have been actually at work for a short time further increases in prices may be expected for free coal to consumers not in the two sections protected by the orders. Until production in the East gains much beyond its present rate, withdrawal by limited embargoes of coal that has been moving to buyers in such markets as Ohio, Michigan and New York will boost the prices to these markets.

Cognizance of this is being taken in Michigan and it is reported that the Governor is to appoint a commission to take charge of coal that reaches that state.

Anthracite is in strong demand in the East, with Philadelphia away behind in deliveries. It is understood that the large companies are shipping west to fill orders there first.

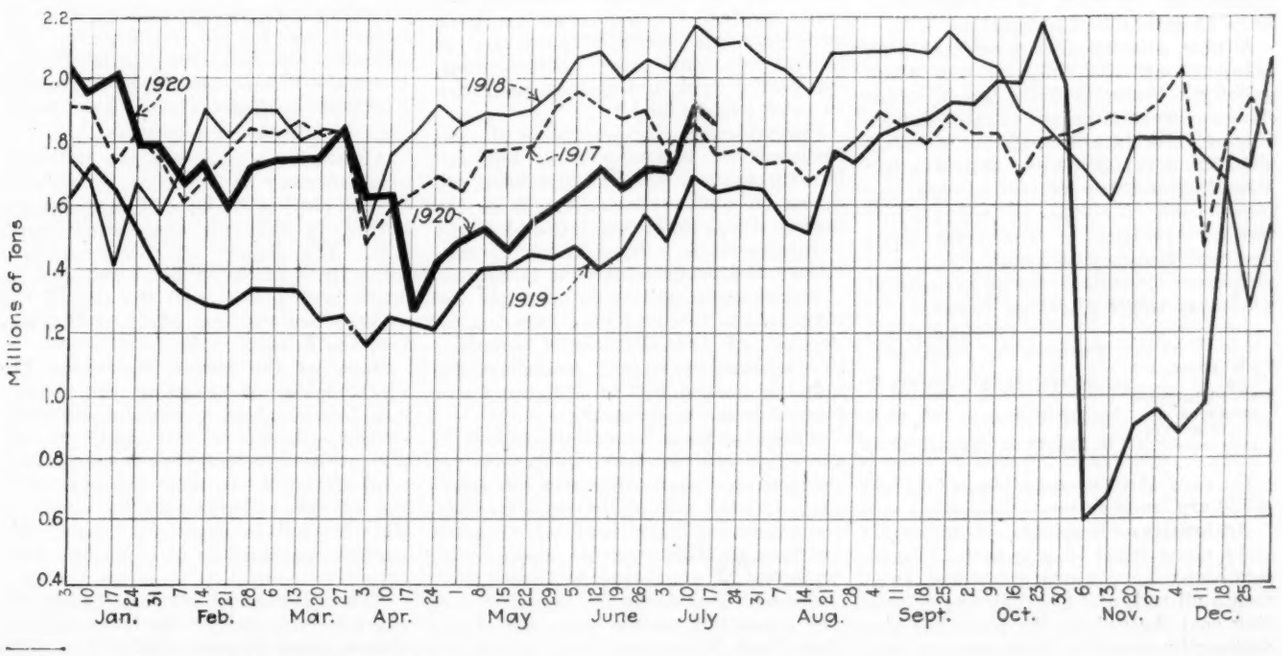
Coke is in short supply with prices high. It is not clear, however, that furnaces are actually suffering for lack of coke.

Lake Coal Dumped Season to July 24

(NET TONS)

	Cargo	Fuel	Total
1919.....	12,203,560	548,373	12,751,933
1920.....	5,611,192	425,741	6,036,933

Average Daily Production of Bituminous Coal*



*From weekly report of Geological Survey.

Reports From the Market Centers

New England

BOSTON

Embargoes Temporarily Restrict Movement All-Rail—Prices Drop, but Market Strengthens Almost Immediately—Hampton Roads Loading Improves—New I. C. C. Priority Order Is Expected—Anthracite Shipments Show but Little Gain, Either by Rail or Water.

Bituminous—For several days this territory was almost completely embargoed. The Boston & Albany lifted its embargo via West Albany on July 21, but to local points only. It is much better to tie things up completely for a few days than to attempt straightening out the tangle piecemeal. There is reason to hope that the last week of the month will show a distinct gain in movement all-rail to this market.

Because of embargoes, there was a mild recession in prices. For two or three days the sales were $10.50 per net ton f.o.b. mines on mediocre grades. However, by July 24 sales were again made on the basis of $13.75 at the mines.

Despatch at the Virginia terminals continues to show gradual improvement. A further increase in clearances for New England is observed, due to the prevailing high prices. About 50 per cent of coal exported is high volatile and a reasonable proportion of the smokeless coals is being moved to New England on contract, to the extent of 80 to 85 per cent of obligations.

A new priority is rumored, this to follow along the lines of the Lake priority. Undoubtedly it would mean close supervision on the part of agents of the Interstate Commerce Commission, but it remains to be seen whether New England buyers will absorb any considerable increase in receipts by water, especially on the price basis that will probably be asked.

Current quotations for bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$11.00@$12.25	$12.00@$13.50
F.o.b. Philadelphia, gross tons	14.00@ 15.50	15.00@ 16.75
F.o.b. New York, gross tons	14.50@ 15.90	15.60@ 17.00

On cars Boston quotations of $17.50 @$20 are made on low volatiles.

Anthracite—Receipts of domestic sizes show little if any gain. Traffic conditions have much restricted shipments all-rail, and the difficulty of getting coal through to the piers has also materially curtailed shipments at tidewater.

Although at Port Reading progress was made last week in loading an accumulation of bottoms, yet the Port Richmond situation is still far from clearing. At the latter piers there is a great deal of difficulty over switching. As a result, one of New England's largest sources of supply by water is much crippled. From New York ports, other than Port Reading, loadings for eastern ports are nearly normal.

At retail, the demand is insistent. Prices to the consumer have not been changed, largely in fear of public criticism, but if the retail distributors are to be obliged to pay present premiums for spot coal as well as heavy demurrage at the loading piers, then it is only a question of time when a quite material advance will have to be made.

Tidewater

NEW YORK

Anthracite Domestic Demand Is Strong and Supply Short—Present Movement Is to the West—Steam Coal Is Unsteady—Turn in Bituminous Market Believed To Be Here—Demand Falls Off and Quotations Take a Drop—Improved Car Supply Helps Situation—Contract Coal Comes Forward in Good Shape.

Anthracite—Domestic coals continue to be in heavy demand but are short in supply. Local conditions show comparatively little change. Dealers are being pushed for deliveries by their customers, and while all have coal in their yards some sizes, notably stove, are hard to get in sufficient quantities to meet the demand.

Dealers continue to complain of slow shipment of company coal, but are hopeful that as soon as the West receives its quota, the movement to the seaboard will greatly improve. A slight improvement is noticed in towing conditions and barge movement is better.

Independent coal is in stronger demand than it would be otherwise, on account of the absence of company product, and as a result quotations are kept up around $11 to $12, the latter figure for the better grades.

There has been much unsteadiness in the steam-coal market. Quotations for independent coals fluctuate considerably. At the end of the week the better grades of buckwheat were quoted at from $4.75@$5 at the mines; rice, $3.25@$4.25, and barley $1.75@$2.50.

Current quotations for company coal, per gross ton, at the mine and f.o.b., New York Tidewater, lower ports, are as follows:

	Mine	Tidewater
Broken	$7.40@$7.55	$9.25@$9.40
Egg	7.40@ 7.55	9.25@ 9.40
Stove	7.65@ 7.90	9.50@ 9.75
Chestnut	7.70@ 7.90	9.55@ 9.75
Pea	5.95@ 6.35	7.70@ 8.10
Buckwheat	4.00@ 4.10	5.75@ 5.85
Rice	3.00@ 3.50	4.75@ 5.25
Barley	2.25@ 2.50	4.00@ 4.25
Boiler	2.50	4.25

Quotations for the domestic coals at the upper ports are generally 5c. higher on account of the difference in freight.

Bituminous—To many observers the turn in the bituminous market is here. Inquiries have fallen off considerably and there has been a noticeable slump in quotations with buying slowing down.

The most plausible reason for the changed condition seems to be that of increased car supply at the mines. Furthermore, in this harbor towing conditions have improved.

Large consumers are as a rule better supplied with coal than is generally supposed, having put in large tonnages of high-priced coal. With lower prices in sight these consumers have discontinued heavy purchasing and from now on will buy only for immediate needs.

The turning point in last week's market made its appearance about midweek when quotations for coal at the mines were around $11.50. Two days later some shippers quoted $1 less and on July 23, Pool 11 was quoted at from $10 to $11 f.o.b. mines.

Contract coals are coming forward in good shape and latest reports show that the public utility corporations are receiving increased tonnages. Quotations fluctuated considerably, but the better coals were generally quoted at around $16.50 alongside toward the end of the past week.

PHILADELPHIA

Anthracite Shipments Are Held Back by New Embargo—Stocks in Yards Are at Low Ebb—Production Is Affected by Car Supply and Attitude of Labor—Hard Coal Is Expected To Advance 10c.—Active Steam Market Prevails—Bituminous Is Shut Out by Embargo—High Prices Are Maintained—Utilities Get Supplies.

Anthracite—Conditions are distinctly unsatisfactory at this time, on account of the placing of an embargo against anthracite coal via the Pennsylvania R.R. The dealers on this road have some little stock on hand and can no doubt keep going until the end of the week, when the real effect of the embargo will begin to be felt.

Some of the larger dealers on the Philadelphia & Reading apparently have been enabled to get a modification of the embargo on this road. No information is forthcoming from the railroad officials as to when a general lifting of the embargo can be expected. This is said to constitute one of the worst situations the local dealers have ever been compelled to contend with.

The collieries are still affected by the car supply, although the last week has shown some improvement. The shippers realize that this loss of tonnage

is going to hamper them in their efforts to live up to the allotments made to their customers in the spring.

The operators also report that even when they do have an adequate car supply their men do not seem to be mining coal with their usual vigor. The wage uncertainty may have made some of them indifferent.

At this time no announcement is forthcoming from the companies as to their price program for the first of August. It seems quite likely that the larger companies will add 10c. to their circular prices. All dealers are careful in booking orders with their customers to amply protect themselves.

The steam market is strong, with buckwheat the leader as usual. The big shippers are declining new business on this size, and as a result the independents are getting increased premiums over the company price of $4.10 at mines. Probably most of the individual buckwheat is sold close to $4.50, and some report no trouble to get $4.75.

Rice in sympathy with buckwheat is enjoying an active season, with the price of all companies holding close to $3. Barley is strong enough to at least command its full price of $2.25 at mines.

Bituminous—Just as a moderate volume of soft coal was beginning to reach the city, the Pennsylvania R.R. declared an embargo against further consignments. Utility plants are unaffected by the embargo.

The spot-price market maintains its high position, with the $15 mark at the mines occasionally reached, although with the bulk of such sales made nearer $13.50 for the better Pennsylvania coals. Fairmont gas coals were selling recently from $12 to $14 per net ton at mines, the lower price being reached when that region for one day received its best car supply for months.

The utility plants in this district are now working under the new plan of filling out forms, whereby they secure assignment of a certain number of empty cars to the mines of the companies with whom they have contracts.

BALTIMORE

Prices Are Out of Control and Leading Coal Men Advise Moderation — Ships Unable To Get Coal Here Are Diverted to Other Ports — Hard-Coal Men Are Hard Hit.

Bituminous—The soft-coal situation here continues complex. It is admittedly out of control as to prices, the highest in the history of the trade being recorded. Sales are being made right along at from $11 to $13 a net ton f.o.b. mines, almost irrespective of grade. In this city sales are recorded f.o.b. piers as high as $17 and $18 a gross ton. Both export and domestic purchasers continue in the scramble for fuel.

Even the payment of high price, however, has not been able to meet either situation. At the outset of the present week about 70 ships were in the harbor for coal, some having been here for several weeks, and at this writing more than 30 have already been ordered to other ports.

The receipts at the Canton pier of the Pennsylvania R.R. have dropped to almost nothing and dumpings are negligible there. At the Curtis Bay pier of the Baltimore & Ohio, at this writing, there are some 2,000 cars, of which about 1,300 are pool-coal cars. The dumpings are running around 400 cars a day, and the amount of coal running to the pier about equals that figure daily. About 37 ships are now off the pier awaiting about 200,000 tons of coal.

Car supply is in the 40 to 50 per cent class on Eastern lines, and priority diversions cut the movement to tide here considerably below normal, the daily report of cars running on the B. & O. being only between 1,200 and 1,500. Another priority order for the Lakes of 4,000 cars a day, exacts some 200 cars from the B. & O., or 10,000 tons daily, and the Pennsylvania for around 9,000 tons daily. Many leading coal men here are advising moderation in prices, and during the past week addresses were made here by officials of the National Wholesale Coal Association to the Maryland branch members, advising a conservative course in the present coal crisis for the benefit of the trade itself as a whole.

Anthracite—The hard-coal men here are hard hit in many cases, despite the recent raise in retail prices. In the first place all are way behind in deliveries because the mines and railroads are backward in getting coal here. Then the proportion of extremely high-priced coal coming in is discouraging. Some dealers are paying as high as $10.50 a ton at the mines for coal. The situation is indeed trying for everybody concerned on this end, neither dealer nor consumer being satisfied.

Lake

MILWAUKEE

Lake Erie Priority Order Is Expected To Change Coal Situation — Lake Receipts Continue Slow and Rail Movement Is at Low Ebb — Market May Depend on Rail Coal During Winter.

Empty yards and slow receipts characterize the Milwaukee coal market. Dockmen are using every means to bring about a change and open up the flow of coal by Lake. The order giving priority to coal shipments to Lake Erie ports is hailed with joy by the anxious coal men, and everything will be done to take full advantage of it.

Lake vessels and the various shipping and receiving docks will have to be worked to the limit of efficiency from now until the close of navigation, if a distressing situation is to be averted the coming winter. A long fall season and favorable navigation conditions on the Great Lakes seem to be the only salvation.

In any event, coal men expect that Milwaukee will have to depend upon rail coal during a great part of the winter, and they are making preparations to handle coal from cars expeditiously. Little coal is coming by rail at present, however, and receipts by Lake are slow.

The receipts for the season up to this writing aggregate 340,902 tons of anthracite and 490,973 tons of soft coal, a falling off in the former of 5,732 tons and in the latter of 1,096,023 tons, as compared with last year's receipts.

BUFFALO

Bituminous Often Changes Front—An End of Extreme High Prices Is Looked For Soon — Anthracite Goes by the Lakes to Northwest—Coke Situation Is Unchanged.

Bituminous—So many new phases of the trade come up that shippers do not know how to size it up from day to day. At the same time the leading members of the trade are pretty nearly agreed that the indications point to an end of the extreme high prices soon. One thing that needs to be done is for consumers to stop bidding against each other at the mines for their coal. It is the competition in that way that has made such prices possible.

All that can yet be said of the price is that $10.50 net at the mines is rather low, although it is accepted. Certain consumers will still pay $12 and there are plenty of sellers who are asking it. At the same time it is pretty generally believed that the turning point is about reached and when the decline comes it will be decided.

The theory on which lower prices are looked for is that the production is now a little in excess of the consumption. Cars are slowly growing more plentiful. If these two changes continue, though they may be slow, they will eventually weaken prices.

Anthracite—The local trade is not in a condition satisfactory to the consumers, but the shippers are not disturbed, as they know that the thing to do now is to neglect the local and railline trade if that is necessary to keep up shipments by water to the Northwest. As these shipments are kept up well there is no real reason for complaint.

Lake shipments for the week were 109,700 net tons, of which 47,400 tons cleared for Duluth and Superior, 23,500 tons for Milwaukee, 15,100 tons for Chicago, 14,300 tons for Fort William, 6,600 tons for Sheboygan and 2,800 tons for the Sault.

Freight rates remain at $1 to the Sault, 65 cents to Chicago, 60 cents to Milwaukee, 55 cents to Sheboygan, and 50 cents to Duluth, Fort William. They vary about 15 cents between fast and slow docks.

Coke—The situation remains the same. Jobbers are obliged to pay $18.50 and up for 72-hr. Connellsville foundry and $17 for furnace. The demand is light for single-order coke, but the furnaces in this district are all active.

Inland West

CINCINNATI

The City Has a Good Supply of Soft Coal, but Little Smokeless and Anthracite—"Buy Early" Is Urged—Cincinnati Has Big Advantage in River Transportation.

There is now no shortage of soft coal in Cincinnati, but there is a scarcity of smokeless and anthracite fuel. Cincinnati dealers in reporting the demand for soft coal note the fact that the shortage on the other grades is due to continue for the balance of this season; also that demand for the fall months is tremendous, and while there is quite a good supply, every known means is being resorted to in having coal users put in their winter supply of fuel as early as possible.

In many cases where users of smokeless coal have held off placing their orders, there is now a feeling among them that their favorite fuel is not to be had, and they are placing orders for the soft coal.

While other cities are short of coal because of the scarcity of coal cars, Cincinnati has soft coal in abundance, due to river transportation. It is possible to obtain coal in the Queen City at $8.50 a ton; the same coal is being sold in Toledo for $4 more a ton.

ST. LOUIS

Coal Situation Is Acute Here—Most of Illinois Mines Close, Due to Labor Trouble—Movement of Cars Is Slow and Conditions Generally Are Unsatisfactory—Prices Are Advancing.

The situation on July 22 began to assume serious proportions in and around St. Louis. The steam proposition has been one of a few days' supply ahead.

On the nineteenth miners began quitting work in the Springfield district, and on the twenty-first the trouble reached Williamson and Franklin counties. On the twenty-second it hit the Mt. Olive and Standard fields and on the evening of the twenty-second nearly all mines were reported idle. On the twenty-third the men refused to go to work until the day help and drivers received anywhere from 75c. to $2 a day more than the present scale calls for.

The domestic situation locally is far behind what it should be at this season, but the tonnage of high grade available is not so small that the public is inclined to take the inferior grades yet. The country situation is rapidly growing desperate and many steam plants will have to suspend.

The Pennsylvania lines continue to haul empty cars east right through the mining field in Illinois day after day. The mines on this line have been idle for five continuous days while thousands of empty cars moved eastward.

The assigned-car evil continues to grow and the railroads of the Middle West seem unable to break up the practice.

No Carterville coal to speak of is coming in; up to the present about one-tenth of the coal ordered from that field has come through. The Mt. Olive situation has been the best of any. The future is quite uncertain.

Prices in the Standard field have been, on coal moving to Canada and as far east as Buffalo, as high as $6.50 and $7; Chicago shipments about $5 and local shipments about $4@$4.50.

Mt. Olive coal has been selling to its regular trade at from $3@$3.75 and $4. Carterville coal is selling anywhere from the old circular of $3.80 up to $6 or $7.

Retail prices in St. Louis advanced on the 22nd to $8 for Carterville; $6.50 for Mt. Olive; $5.75 and $6 for Standard. Smokeless coal, anthracite, Arkansas and coke are off the market, with no receipts.

DETROIT

Movement of Coal Into the City Does Not Improve—Governor Sleeper Is To Appoint Commission To Control State Fuel Supply — Scarcity of Anthracite Alarms Dealers and Consumers.

Bituminous—Jobbers and wholesalers in Detroit say there is no improvement in the movement of coal into the local market. With the summer more than half gone, while virtually no progress has been made toward creating reserves for industrial plants, public utilities and retail yards, consumers in all lines are becoming apprehensive that a coal shortage in Michigan will develop next winter that will occasion much hardship and suffering.

Under the direction of the Michigan Public Utilities Commission, a conference was held in Lansing, July 21, to discuss the situation and plan some method for increasing the supply of coal in the state. Nearly all sections of the state were represented and from each came reports of insufficient coal supply and ineffectual effort to obtain relief.

The appointment of a state coal commission of five or more members to be named by the governor was decided on; the commission will include men who have a thorough knowledge of the coal industry and of present transportation difficulties. Thus Michigan hopes to control the matter of supply and will exert every effort to increase the tonnage as speedily as possible. Governor Sleeper dispatched a message to the Interstate Commerce Commission urging the promulgation of an order shutting off reconsignment of coal.

The miner's strike in Illinois threatens to still further diminish the meager supply of coal that has been coming into the state.

Anthracite—Domestic consumers as well as the dealers in Detroit are becoming alarmed at the continuing scarcity of anthracite and the lack of results from efforts to increase the volume of shipments. Unless improvement develops speedily, many of the homes of the city will be without hard coal during the coming winter.

COLUMBUS

All Ohio Fields Show Increased Output, Due to Better Car Supply — Demand Is Strong with Prices Higher Than Ever—Priority Order Is Expected To Help Lake Situation.

All mining fields in Ohio report a better car supply and production is showing an increase as a result. This is not as noticeable now as it is expected to be within a week or two, when the full effect of the car-priority order is felt. But the net result is a better supply of empties at all Ohio mines, and production figures have advanced beyond the 50 per cent mark.

In the Hocking Valley field the output has been between 65 and 70 per cent and the same is true of Pomeroy Bend. In Cambridge and Crooksville the output is about 66 per cent. Eastern Ohio also shows an improvement with an output of about 55 to 60 per cent, a large part of which is going for Lake and fuel purposes.

Dealers are now in the market for larger amounts and to a certain extent their orders have been taken care of. Retail stocks are not large in any section and householders are clamoring for deliveries.

Retail prices are ranging higher than ever before. Hocking coal sells in the neighborhood of $9.50 @ $10.50 and the other grades at about the same levels. West Virginia splint sells from $10 @ $11 delivered and practically no Pocahontas to be had in the Columbus market. Some Kentucky grades are coming in but not sufficient to cause much change in general market conditions.

The steam trade is also active and bidding for the available supply is still the chief feature. General manufacturing is in the market for a considerable fuel tonnage. Public service concerns are now easier on the priority order news, while commercial users, outside of the preferred classes, are getting more anxious than ever.

Prices at the mines are still high and show a wide range. Concerns with contracts are still easy while those without connections find it difficult to keep factories going.

The Lake trade is holding up well at previous levels, but there is a marked deficiency in the tonnage moved and the falling off from the records of last year. Reports from the Northwest show a big recent priority order is expected to help this situation.

Prices at the mines for the principal grades consumed in the Columbus district are as follows:

Hocking lump	$6.00@$8.50
Hocking mine-run	6.00@ 8.50
Hocking screenings	5.50@ 8.25
Pomeroy lump	6.50@ 9.00
Pomeroy mine-run	6.50@ 9.00
Pomeroy screenings	6.00@ 8.50
West Virginia splint lump	6.50@ 9.00
West Virginia splint mine run	6.50@ 9.00
West Virginia splint screenings	6.00@ 8.50
Pocahontas lump	7.00@ 9.50
Pocahontas mine run	7.00@ 9.25

CHICAGO

Strike in Southern Illinois Alarms Manufacturers Who Face Shutdown from Lack of Fuel — Chicago Association Will Fight Reconsignment Ruling of Railways.

Chicago is extremely worried over the growing strike in the southern Illinois coal fields. Manufacturers who thought they were protected find now that they are face to face with a shut down on account of no coal and are bending every effort toward purchasing additional fuel. Mines in Indiana coal fields have not been affected as yet, and operators having mines in that state are being swamped with inquiries for coal. In the face of these conditions it can be easily understood that the market is advancing.

Until this new complication came up the situation in Chicago was fairly satisfactory as the retail dealers had an opportunity to accumulate a little surplus, while buyers of steam coal were much better off than they have been since April.

At a meeting a few days ago of the Chicago Wholesale Coal Association, steps were taken to fight the recent reconsignment ruling of the railways. Wholesalers maintain that they have not held coal on tracks in Chicago, have not blocked terminals and that fuel shipped to them at Chicago has been reconsigned long before the coal had an opportunity to reach this city. It is said that the association has hired an attorney to fight the railways on the question.

During the past week or so some Pocahontas and smokeless coal has been coming into Chicago to the retail trade, but in quite small quantities. Public utility plants in Chicago are facing great difficulties because they are unable to get enough steam coal to satisfy their needs.

MIDWEST REVIEW

Midwest Faces Most Serious Situation — Wholesale Shutdown Confronts Industrial Plants — Market Takes Sharp Upward Trend — Mine Labor Trouble Closes Practically All Coal Plants in Illinois.

The coal situation in the Middle West is more serious than it has ever been before in the history of the industry in this territory. The strike in Illinois is spreading rapidly and those covered by a fuel contract are now faced with the probability that they will have to go without coal for the time being. The market has taken a sharp upward trend on every kind of coal from Illinois or Indiana.

Considerable dissatisfaction is felt in this territory that the Interstate Commerce Commission has not seen fit to take a firm stand with the railroads and force its rulings through. Cars continue to be scarce in the Illinois and Indiana fields, and conditions are quite unsatisfactory.

The trouble in Illinois is that day labor, at some of the Illinois mines, who have been putting over sporadic strikes for the past month, now come out in the open and demand an increase of 25c. per hour, time and a half for over time and double time for Sundays and holidays. According to the latest information, practically all of the mines in Illinois are idle.

The present situation boils itself down to the fact that unless this strike is settled quickly, it will mean a great many industries, both essential and non-essential, in the Middle West, will be forced to close down on account of no coal. Once more it is up to the authorities at Washington and it will be interesting to watch what happens. Needless to add, the operators are not too optimistic.

South

LOUISVILLE

Service Orders Increase Car Supply and Production Follows — Demand Is Strong and Prices Hold — Rumors Are Heard of Federal Control of the Coal Industry—Retailers Are Inactive.

Production at Kentucky mines is increasing as a result of a slightly increased car supply, which is steadily growing on account of regulations concerning empties.

It is claimed that prospects are steadily looking better, and that with a few more weeks of good car supply the industrial demand should let up and block coal be in better demand at lower prices. However, demand is keeping pace with production, and prices are about the same, there being some quite high levels reported from all fields, with little weakening as a whole.

Rumors have been floating around for the past few days relative to a possibility of an early return of the coal trade to Federal control, and there is some uneasiness being shown. There are also cases reported of agents of the Department of Justice entering local coal jobbing and other offices, and asking for records of receipts and shipments along with prices.

Retailers are still buying little coal, meanwhile sitting still awaiting developments and better supplies at less money. Consumers are not making inquiries just now, due in part to hot weather and vacations.

Prices are as follows: Eastern Kentucky gas mine-run, $9@$9.50; non-gas, $8.50@$9; Western Kentucky, lump, $5@$5.50, average; mine-run, $4,50@$4.75; screenings, $4.50@$4.75. However, some West Kentucky lump is selling at $6.75.

BIRMINGHAM

Production Shows Steady Gains as Labor Troubles Disappear—Transportation Is Fairly Good — Demand Is Excellent, but Little Spot Coal Is Available—Much Tonnage Is Lost on Contracts During Strikes.

The determination of Alabama coal operators to maintain "open shop" conditions, which have prevailed in the district for many years past, has resulted in resumption at a number of mines closed on account of the strike for union recognition; production is being increased daily as additional men abandon the organization and return to work, and it is expected that normal output will be reached in the course of ten days or two weeks. The increase in coal being moved is already quite noticeable.

The car supply is reported as adequate on the Frisco lines, while the Southern is fairly approximating the needs of most of the mines it serves, but has been a little short at some operations. Louisville & Nashville is about maintaining its quota of 45 to 50 per cent, as furnished for the past several weeks. The resumption of work at a number of mines, which have been idle for several weeks, will perhaps slightly decrease the allotment of cars to operations which have been going steadily.

Market conditions so far as demand goes are excellent, but no coal interests are in a position to take on additional orders at this time and there is little spot coal to offer, hence quotations are not being made by the larger brokers and agencies. It will take considerable time to recover from the tonnage lost during the strike period and catch up with deliveries on contracts in hand, and until this is done there will be little coal obtainable in this district.

The output for the week of July 10 was the smallest reported in many months, approximating 262,000 net tons. Alabama produced 15,928,196 tons of coal in 1919, as shown by the final tabulations of Chief Mine Inspector C. H. Nesbitt, or a decrease of about 3,900,000 tons from the record of 1918, the loss being attributed to slack demand during the first half of the year, poor car service, strikes, etc., when the market was strong but the coal not available.

West

SAN FRANCISCO

Bunkering End of the Trade Is Prospering and Domestic Market Is in a Healthy State.

With three of the fleet of barges of the King Coal Co. now fitted up with patented apparatus for the bunkering of steamships, great speed is being made in placing large quantities of coal in the holds of vessels at port. More large carriers are coming here than ever before. With the bunkering end of the coal business prospering and the domestic trade in a healthy state, dealers are not worrying much these days.

The bituminous prices, f.o.b. mines, wholesale, Utah and Wyoming, per net ton, are as follows: Stove and lump, $4.50. The bunker price is $13.55.

News From the Coal Fields

Northern Appalachian

CONNELLSVILLE

Coke Market Is Strong with All Offerings Absorbed — Car Supply Limits Beehive Output to 30 Per Cent — Byproduct Production Is Fairly Large.

The spot coke market is a shade stronger than a week ago. Undoubtedly many consumers, both furnace and foundry interests, are unwilling to pay present prices although in need of coke, but thus far there have been enough who are willing to absorb all offerings.

In some quarters it is thought that offerings in the spot market are slightly heavier, and it is possible that here and there an operator is offering spot coke when full shipments are not being made against contracts. Generally speaking, however, the offerings in the spot market are by operators who have few or no contracts.

Connellsville coke production is not increasing but indeed shows a remarkably steady rate, even though this rate is about 30 per cent below the rate obtaining for several weeks before the rail strikes began in April. Car supply, of course, remains the limiting factor.

The byproduct ovens are working fairly well, being almost completely supplied with coal, but they are offering no coke in the open market, so that the Connellsville operators have the demand to themselves. The Connellsville market is quotable at $18@$18.50 for spot furnace and at $19@$19.50 for spot foundry, contract being practically nominal at $12@$13 for furnace or foundry, all quotations being per net ton at ovens.

The *Courier* reports production in the Connellsville and Lower Connellsville region in the week ended July 17 at 171,795 tons, an increase of 9,405 tons over production of the preceding week, which contained the holiday, but a decrease of 6,495 tons from production of the week before that.

FAIRMONT

Northern Regions of State Improve Output, Due to Larger Run of Cars—Baltimore & Ohio Will Furnish 100 Extra Cars a Day—Railroads Still Take Much Coal—Fuel Goes to New England and the Lakes.

While production in the Fairmont and other northern West Virginia regions had its ups and downs during the week ended July 17, there was on the whole a decided improvement. There were only five working days during the preceding week, but aside from that there was a much larger run of cars, day for day.

During the first two days of the week loadings had eclipsed those for the entire preceding week. The total number of cars loaded was not far from 5,000 on the Monongahela division of the Baltimore & Ohio R.R., production as a result being the best since April.

Mines on the Monongahela R.R. in West Virginia were in somewhat better shape to produce more coal than during the preceding week, having a better supply of empties. An interesting announcement made during the week was that a compromise had been reached in the case pending before the Interstate Commerce Commission to force the Monongahela to make up a heavy deficit in the car supply, the railroad agreeing under the terms of the compromise to furnish 100 extra cars a day.

The fact that the car supply was somewhat short during certain days of the week did not prevent the railoads from securing all the coal they needed, and, even in the face of decreased placement, there was no decrease on any one day in railroad fuel loadings.

Curtis Bay shipments were heavier on Monday than on any other day of the week, but export shipments were still limited, since much of the coal consigned to Curtis Bay was for New England points. Although Lake shipments outranked those for the previous week they were still not particularly large in volume.

PITTSBURGH

Car Supplies Improve Slightly—Problems of Increased Lake Shipments Are Being Worked Out—Further Car Supply Increases May Uncover a Labor Shortage.

Following the renewal of Order 7, giving preference to coal mines in the matter of car supplies for another 30 days (to Aug. 19), the Interstate Commerce Commission has accorded priority in coal to the requirements of public utilities, hospitals, etc.

Operators, Lake shippers and railroad officials are working out jointly the details of a plan whereby each operator in the districts serving the Lake trade is required to sell a certain portion of his output for the Lake trade (if not already sold), the price being below that obtaining in the open market, and the decisions will be enforced through the medium of car supplies.

The new interpretation of Order 7, whereby flat-bottom gondolas under 36 in. high (inside measurement) are not considered coal cars, does not seem to have taken many cars from the coal trade, since the iron and steel interests, who had urged the ruling, assert that they have received few additional cars.

A fair estimate seems to be that a car supply equal to 65 or 70 per cent of ratings would take care of all the coal the miners will dig, though the number on payrolls, working full time every day, would equal a car supply of 90 to 100 per cent.

The spot coal market is no higher, but it shows no signs of weakening. The market is quotable at $10@$12 per net ton at mine, Pittsburgh district, the minimum being the lowest at which even steam slack could be bought, while the maximum has been touched by ¾-in. gas, with byproduct falling between.

Estimates of Production

FROM THE WEEKLY REPORT OF THE GEOLOGICAL SURVEY

BITUMINOUS COAL.

	1920 Week	1920 Calendar Year to Date	1919 (a) Week	1919 (a) Calendar Year to Date
July 3b	10,286,000	262,359,000	7,459,000	218,099,000
Daily average	1,714,000	1,665,000	1,492,000	1,393,000
July 10b	9,616,000	271,975,000	10,225,000	228,324,000
Daily average	1,923,000	1,673,000	1,704,000	1,404,000
July 17c	10,969,000	282,945,000	9,889,000	238,213,000
Daily average	1,828,000	1,678,000	1,648,000	1,413,000

ANTHRACITE

	1920 Week	1920 Calendar Year to Date	1919 (a) Week	1919 (a) Calendar Year to Date
July 3	1,730,000	43,642,000	1,394,000b	40,049,000
July 10	1,500,000b	45,141,000	1,849,000	41,898,000
July 17	1,790,000	46,931,000	1,795,000	43,693,000

BEEHIVE COKE

United States Total

Week Ended July 17 1920 (c)	Week Ended July 10 1920 (b)	Week Ended July 19 1919	1920 to Date	1919 (a) to Date
378,000	361,000	344,000	11,646,000	10,442,000

(a) Less one day's production during New Year's week to equalize number of days covered for the two years. (b) Revised from last report. (c) Subject to revision. All figures in net tons.

NORTHERN PAN HANDLE

Railroads Furnish Over 50 Per Cent Car Supply—Man Power Is Expected To Increase if Run of Empties Builds Up—Market Far Exceeds Output—Conditions Similar to Pan Handle Prevail in Eastern Ohio.

There was an upward trend to production in the northern Pan Handle during the week ended July 17, not only because of the larger number of working days, no holiday stopping production, but also because of a further slight improvement in the car supply. Railroads serving the district managed to maintain a car supply slightly in excess of 50 per cent.

Lack of sufficient man power still operated to some extent, however, to restrict production, but if railroads are able to maintain the supply of empties at or above 50 per cent for any length of time, then operators are confident that they will be able to build up their mine working forces.

Operators had no general complaint to make as to the movement of loads over all roads, such congestion as had existed having been cleared up. The fact that production was better, however, did not enable producers to catch up with the demand by any means, there being a market far in excess of the ability of operators to meet.

As conditions which affect the northern Pan Handle also apply to the eastern Ohio fields there was an upward trend to production in those districts, the car supply being about the same as maintained in the northern Pan Handle, or about 64 per cent.

Middle Appalachian

POCAHONTAS—TUG RIVER

Smokeless Fields Operate to 85 Per Cent of Capacity—Improvement Ascribed to Service Order 7—Large Pocahontas Tonnage Moves East, However, but Little Is Exported—Tug River Exceeds Record of Last Nine Months—Miners Do Not Load All Cars Offered.

Substantial gains in production were made in both the Pocahontas and Tug River fields in the week ended July 17 under the stimulus of a further improvement in the car supply, there being in the fields combined (it is estimated) about an 85 per cent car supply. In other words, mines were operating at the rate of about five full days a week at the least. The gain was all the more marked because of the shortened production during the holiday week.

Of course the two smokeless districts have fallen heir, as it were, to many cars which under normal conditions would be distributed among the mines in the Williamson field where a strike is now in progress. However, aside from that, incoming cars from both eastern and western points were sufficient to materially increase transportation facilities. The improvement, by many, was ascribed to Service Order 7 relating to the use of open tops.

Mines in the Pocahontas field forged ahead of the previous week in point of production not only because there were a larger number of working days available but also because cars were more plentiful. Mines in this field were able to put in nearly a full week, as production represented about 83 per cent of potential capacity, the increase in the ouput as a result being most marked.

The larger supply represented an actual gain in the run of empties from both the East and West. It was believed by operators that Service Order 7 had much to do with improvement, particularly as to the Western sources of supply. Only a comparatively small portion of the tonnage was being exported, although quite a large tonnage was being moved to eastern points.

Production records for the last nine months were smashed during the week ended July 17 in the Tug River field when the output reached a total of 102,000 tons, that being by far the best loading of any week in the period above mentioned.

There was a big improvement in the car supply, there being in fact more railroad cars than miners showed any disposition to load. Now that the car supply in the Tug River field is approaching 100 per cent, miners are much more indifferent about working, as is usually the case, though Tug River loading during the period ended the seventeenth was quite good.

The outlook for the car supply during the balance of the month is considered excellent, and the hope has been expressed that mine employees will take full advantage of the good car supply for their own benefit as well as for the benefit of the operators.

KANAWHA

Chesapeake & Ohio Mines in Kanawha and Coal River Territory Get 50 Per Cent Car Supply—Cars Were Scarce in Kanawha & Michigan Area—Export Shipments Are Curtailed and Coal Goes to the Lakes.

While it is true that more cars of coal were loaded in the Kanawha field during the week ended July 17 than during the period immediately preceding it, the difference was due more to the fact that there were six working days in one case and only five in the other, than to any increase in the car supply.

It is not believed there was more than a 50 per cent car supply at the most in the Kanawha and Coal River fields tributary to the Chesapeake & Ohio Ry. In the Kanawha & Michigan area on the north side of the Kanawha River, conditions were not so good, cars being extremely scarce in fact in that section. On some days not more than half as many cars were placed as during the same days of the preceding week.

Kanawha coal was still under embargo, in so far as tidewater was concerned, making it necessary for producers to go in the open western market and ship the difference to western pionts. It had the effect of course of swelling Lake shipments to a limited extent. Export shipments between July 1 and July 17 had been materially curtailed, as had no doubt been intended.

VIRGINIA

Shipments Increase from Southwest Virginia, Reaching a Capacity of 76 Per Cent—Commercial Tonnage Gains but Little—Demand Is Heavy.

Mines in the southwest Virginia coal field managed to reach a total production of 131,000 tons, or 76 per cent of capacity, that being an increase of nearly 30,000 tons over that of the preceding week. In addition to the above tonnage for shipment there were produced 32,000 tons to be converted into coke.

The entire loss in production in the field of 40,000 tons, representing 23 per cent of potential capacity, was due to a shortage of cars. The best car supply was furnished by the Interstate R.R., that reaching 90 per cent, the Norfolk & Western falling down to a greater extent than any other road supplying the district.

Since the first of the month there has been quite a material increase in the car supply, although a large proportion of cars furnished are assigned, and consequently there has not been much gain in the volume of commercial fuel produced.

The demand from all sources, as is the case elsewhere, continued to be quite heavy, with the tonnage of free coal available rather limited, as producers have about all they can do to take care of contracts.

NORTHEAST KENTUCKY

Output Decreases Due to Failing Car Supply—Labor Is Demoralized by Irregular Work—Most of Tonnage Is Shipped to Inland West Markets.

Instead of any improvement being in evidence in production in the northeast Kentucky field during the week ended July 17 there was a decided decrease in the output due to a failing car supply, the decrease in fact amounting to 7 per cent. Out of a total of 323,000 only 127,000 tons, or 39 per cent of potential capacity, was produced, the loss remaining being 195,000 tons, all but 7,000 tons of that loss being attributable to car shortage. During the same period of 1919 production amounted to 71 per cent of potential capacity.

The Interstate Commerce Commission's Service Order 7 has certainly not accrued to the benefit of the mines in northeast Kentucky. The car supply on the Chesapeake & Ohio slumped during the week to the extent of 11 per cent, while the mines located on the Louisville & Nashville were able to increase their working time to the extent of about 10 per cent. Conditions are so bad that working forces are becoming demoralized owing to irregularity of work. Between July 1 and

July 17 there had been only a 40 per cent car supply on the Chesapeake & Ohio and a 44 per cent supply on the Louisville & Nashville.

The greater part of the tonnage produced during the week ended the 17th (or 81 per cent) was shipped to inland West markets. The Lakes received 17 per cent of the outtput, showing a slight increase, railroads secu-ing about 2 per cent of the total output. In other words, no eastern Kentucky coal was finding its way eastward. Market conditions throughout the week re- ained practically unchanged.

NEW RIVER AND WINDING GULF

Virginian Ry. Mines Operate 4½ Days and C. & O. Plants Three Days Out of the Six on the Gulf—Better Times Are Expected Within Month or So—New River Field Secures 50 Per Cent Car Supply—Embargo Limits Shipments to Tide and Increases Volume West.

Production in the New River and Winding Gulf fields fell short of expectations during the week ended July 17. There was not the increase there should have been. While, of course, there was a larger output than during the previous week, when a holiday interfered with operations, nevertheless it is doubtful if the output reached that for the week ended July 3. There was not more than a 50 per cent supply in so far as the Chesapeake & Ohio Ry. was concerned. Eastern shipments were limited to some exent by an embargo applying to low-volatile shipments to tidewater.

Mines on the Virginian Ry. in the Winding Gulf field had the edge on Chesapeake & Ohio mines to the extent of a day and a half when it came to operating, because plants on the first named road secured a supply of cars sufficient to enable them to operate about four and a half days out of the six. Not more than three full days' supplies during the week were vouchsafed mines on the Chesapeake & Ohio in the Gulf region, or approximately a 50 per cent supply.

Although announcement was made some time ago that the new 120-ton cars would begin to arrive on the Virginian Ry. in July, so far no 120-ton cars had been observed on the line. Producers on the Virginian are rather inclined to believe that within another six weeks there will be a supply of cars sufficient for all requirements, as there has been a steady improvement in transportation conditions during the last few weeks.

Rumors are in circulation to the effect that several more companies operating on the Virginian in the Winding Gulf field will change hands in the near future.

There was not as large an output in the New River field last week as the car supply during the early part of the week led producers to believe there would be, the empties furnished not holding up after the first half of the week; although total production for the entire week was somewhat in excess of that for the preceding working period, chiefly because there were six full working days. However, the car supply was more than 50 per cent of requirements. As compared with the first half of the previous week, there was an increase in the output.

After a week's leeway in shipping to tidewater the only coal which could be moved to such a point during the period ended July 17 was that to Pools 1 and 11. In consequence of such an embargo western shipments were enlarged in volume. It is hoped that next week's production will improve.

LOGAN AND THACKER

Lack of Adequate Transportation in the Logan and Strikes in the Thacker Field Curtail Production—Output Is About 30 Per Cent of Production—State Police Are Sent to Mingo County.

From one cause and another high-volatile production in the Logan and Thacker fields was much curtailed during the week ended July 1. Lack of adequate transportation facilities on the Chesapeake & Ohio was one of the principal causes; however, this did not affect production in the Thacker field. A strike was the main cause for low output in the Thacker field. Rather a heavy loss resulted, production in the fields named running not much over 30 per cent of potential capacity.

While during the holiday week mines in the Guyan field managed to produce 180,000 tons of coal (despite the holiday) there was a decided drop during the following week, when, as a matter of fact, there should have been a decided increase. However, it was impossible to accomplish that in view of the fact that there was only a 30 per cent car supply afforded mines for the week as a whole. Logan mines were still cut off from tidewater but some Logan coal was flowing eastward; however, the bulk of the production was going to Western markets.

Even with a Sunday accumulation of cars the mines only produced 49,000 tons on Monday. That tonnage had dropped to 29,000 tons by Tuesday and to 15,000 tons by Wednesday as against 24,000 tons for the same day of the previous week. On Thursday there was an output of only 22,400 tons as against 53,000 tons for the Thursday preceding.

There was little change in the labor situation in the Williamson field during the week, one or two mines closing down to await the outcome of the strike which has affected production in a part of the Williamson region. It is estimated that the tonnage loss as a result of the strike amounts to about 150,000 tons a week. Organizers of the United Mine Workers had made no headway in organizing Pond Creek mines and production was still continued on the usual scale at these operations.

At one or two points on the border between West Virginia and Kentucky, striking miners sought to intimidate miners still at work by firing into their midst. Again, when some of the larger plants in the field which had been closed down attempted to resume operations on Tuesday, July 20, the striking miners opened fire on one mine, 200 shots being exchanged. Owing to such tactics it became necessary to send a large detachment of state police back to Mingo County to prevent the sniping, in which the striking miners are engaging.

MINGO COUNTY

Branch Line of N. & W. Ry. Is Being Constructed Up Pigeon Creek in Mingo County — Kountze Interests Have Leased Number of Tracts to Local Parties—Coal Is Similar to That in Logan County.

Construction of a 19-mile branch railroad from Lenora, Mingo County, W. Va., up Pigeon Creek to Rockhouse and thence on that creek to its head, opening up coal lands is under way.

The railroad will cost probably more than $3,000,000. It joins the line of the Norfolk & Western at Lenora. It has been rumored that the Norfolk & Western would build a line from Ajax through the mountains to Kermit, crossing the river there and down the Kentucky side to Fort Gay.

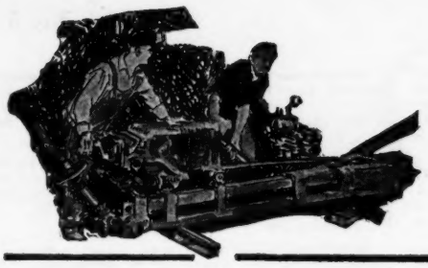
The deal for the railroad was put through some time ago between the Kountze interests, or the United Thacker Coal Co., New York, and the Norfolk & Western Railroad. The Kountze interests have leased a number of tracts of the coal lands to local capitalists, including Garner Fletcher, Elkhorn Piney Coal Mining Co., George S. Wallace, attorney, and associates, A. B. Rawn, Solvay Collieries Co., and H. H. Morris, West Virginia Standard Coal Co.

Similar coal to that mined on Island Creek in Logan County, including Chilton, Thacker, Winifrede and Coalburg seams, is found on Pigeon Creek. A 15,000-acre tract of timber will be operated by Harry M. Gorman and associates.

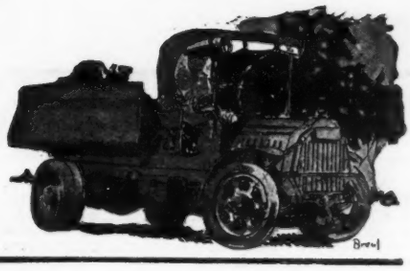
INDIAN CREEK VALLEY

Suit Is Entered Against Coal Operators by P. R. R. to Prohibit Them from Draining Mine Water Into Indian Creek.

The Pennsylvania R.R. has instituted suits against coal operators of the Indian Creek Valley in Fayette County, Pa., seeking to prohibit them from draining water from their mines into the stream. The railroad claims it has invested $7,500,000 in the water rights and distribution throughout the Monongahela division, but avers that water containing sulphur from the mines pollutes it to the extent that the water cannot be used in engine boilers. Suits have been instituted against the Indian Creek Coal & Coke Co., the Indian Creek Valley Coal Co., the Rogers Coal Co., the Crooked Creek Coal Mining Co. and the Warwick Coal Company.



Mine and Company News



ILLINOIS

Herrin—The Madison Coal Corporation, of Chicago, has completed a 2-mile switch to old Blairsville, northwest of here, and work has started on a new mine. It is expected that the mine, which will be one of the largest in the field, will be completed in about a year's time. The company will build a village on the new townsite, starting off with 25 houses; the second lot will include 75 houses. The mine will be a modern plant operated by electricity.

Murpheysboro—The American Coke & Chemical Co., of St. Louis, has purchased the mining properties of the Big Muddy Coal & Iron Co., which owns and operates five mines in the southern Illinois field. Two of the mines are in Williamson County and three are located in Jackson County.

The deal includes a large acreage of coal land. The purchasing company, according to report, has entered into an agreement whereby the Chicago, Wilmington & Franklin Coal Co., will operate the mines. The latter company is one of the largest producers of coal in that field.

The American Coke & Chemical Co. has also been taking up extensive coal options in Hamilton and Jefferson Counties and is now putting down drill holes on the lands.

Gillespie—All previous records of mine No. 3 of the Superior Coal Co. have been shattered during the month of June. In addition, the local shaft established a high mark for Macoupin County. A total of 110,103 tons of coal, or a daily average of 4,812 tons, were produced during the 22¾ days the mine operated last month. Much credit is given by officials to the fast caging and emptying of cars. The best daily hoists were made on the following days: June 9, 5,020 tons; June 12, 5,106 tons; June 29, 5,128 tons and June 30, 5,140 tons.

KENTUCKY

Pikeville — Some 70,000 acres of Kentucky coal land, covered with vast forests of timber, will be developed on an extensive scale by the Virginia Coal & Coke Co., which has been organized recently in Roanoke, Va. The capitalization is $10,000,000 and the management is under the control of Roanoke and New York financiers and investors interested in the Virginia Iron, Coal & Coke Co., which is developing important iron and timber land and operating blast furnaces.

The 70,000 acres are located in the counties of Leslie, Letcher, Pike and Perry, where mills will be installed, mines equipped and railways constructed for thorough development.

Pineville—Announcement was made here recently that the Ford Motor Co., had purchased the extensive mining properties of the Banner Fork Coal Corporation in Harlan County, near Pineville, at a reported price of $1,500,000. It is also reported that the Banner Fork people represent Virginia capitalists. This coal plant is considered one of the largest operating properties in the state.

PENNSYLVANIA

Waynesburg—A deed was placed on record here recently for the transfer of almost 8,000 acres of coal in the vicinity of Clarksville, Green County, from J. G. Patterson, of Pittsburgh to the W. J. Rainey interests. Most of the coal lies in Green township between the forks of Ten Mile Creek. The consideration in the deed is $1; but the deed contained $3,000 in revenue stamps, indicating that the real consideration was $3,000,000. The coal underlies 27 different farms.

Pittsburgh — The Hillman Coal & Coke Company, of Pittsburgh, Pa., formerly the United Coal Corporation, is increasing its capital stock to $33,000,000, and it is reported it will merge into the one corporation all the associated Hillman companies now under the same management, including the Hecla Coal & Coke Co., Thompson-Connellsville Coke Co., Belle Vernon Coke Co., Clarksburg Gas Coal Co. and the Luzerne Coal & Coke Co.

At present the Hillman Coal & Coke Co. operates eight mines in Allegheny, Washington, Fayette, Westmoreland and Somerset counties, Pa., and Preston County, W. Va. The Hecla Coal & Coke Co. operates five coal and coke plants in Washington, Fayette and Green counties, Pa.; the Clarksville Gas Coal Co., one mine in Green County, Pa.; the Belle Vernon Coke Co., a plant in Fayette County, Pa.; the Luzerne Coal & Coke Co. and the Thompson-Connellsville Coke Co., each operate one plant in Fayette County, Pa.

The officers, all of whom are in Pittsburgh, are J. Harte Hillman, Jr., chairman of the board; Tracey W. Guthrie, president; William L. Affelder, assistant to the president; Thomas Watson, vice president and secretary; A. B. Sheets, vice president; Ernest Hillman, vice president; Robert W. Flenniken, treasurer; F. B. Lockhart, general manager of sales; Harrison T. Booker, general manager of mines; J. Dickenson Martin, chief engineer; Royal A. Miller,

Indiana—The Graceton Coke Co., at Graceton, Pa., owned by the Youngstown Steel Co., Youngstown, Ohio, has been sold to Warren Delano of New York for $750,000. Mr. Delano is principal owner of the Vinton Colliery Co., at Vintondale, Cambria County, Pa. An inventory is now being made and the new owners will take charge Sept. 1. Chester M. Lingle, general manager, will go to Greene County, where he will be general manager of the Buckeye Coal. Co.

Scranton—Two men were killed and a third man was mortally injured as the result of a tower collapse on the Marine No. 2 breaker of the Hudson Coal Co. at North Scranton.

All three men were employed as carpenters and plunged 125 ft. to the ground as the tower crashed down.

WEST VIRGINIA

Mt. Hope—Last June the stock of the Fire Creek Coal Co., operating in Raleigh County, was sold to the Smokeless Coal Corporation, a company in which eastern capitalists are said to be largely interested. It is understood that the sum involved was above $500,000. These mines have been in operation for some time in connection with the development of a leased tract of 1,600 acres.

Huntington—The Central West Virginia Coal & Lumber Co., which recently increased its capital stock from $250,000 to $500,000 with a view to an expansion of the business, has as the first step in such expansion opened an office in this city and has appointed Walter E. Morgan as its Huntington manager.

St. Albans—The Nellis Coal Co., is planning the erection of a new steel tipple at its properties in the Coal River district, Boone County. The structure will be provided with shaker screens and other up-to-date equipment. It is estimated that the improvements here will cost about $200,000.

Clarksburg—Connellsville, Pa., people among them being Thomas Love, and W. A. Furlong, have purchased a large tract of coal land from the New Superior Coal & Coke Co. in Clay District of Harrison County. It is understood that the consideration involved was $215,000.

Charleston—The Pointlick Coal Co. is going ahead with plans for the development of its lease on Campbell's Creek in the Kanawha County field. This company has perfected its organization by the election of the following officers: H. M. Davidson of Charleston, president and general manager; A. W. Alden, Bluefield, vice president; J. P. Cofer, Bluefield, secretary and treasurer.

Trade Catalogs

Airveyor—Guarantee Construction Co., 140 Cedar St., New York, N. Y. Bulletin 126. Pp. 20; 8½ x 11 in.; illustrated. Description of apparatus for handling various materials by means of pneumatic conveyors. Installations noted.

Superpump and Hydraulic Machinery—Traylor Engineering & Manufacturing Co., Allentown, Pa. Bulletin 101. Pp. 49; 6¾ x 9¼ in.; illustrated. Description of the new Traylor pump and other hydraulic machinery, including information of interest to users of pumping machinery.

Announcement—Yale & Towne Manufacturing Co., Stamford, Conn. Folder. Pp. 4; 8½ x 12 in.; illustrated. Announcement of the purchase of the Industrial Electric Truck Division of the C. W. Hunt Co., of Staten Island, N. Y., by the Yale & Towne company. The trucks and allied equipment are fully illustrated.

Personals

J. S. Niles has been appointed traffic agent in the Chicago district for Kennedy, Floyd & Co., of Chicago.

F. R. Wadleigh has been appointed export sales manager of the Weston Dodson & Co., Inc., with offices at 4006 Woolworth Building, New York City.

J. A. Galligan has resigned as sales agent of the Pickands, Brown & Co., of Chicago. **R. S. Dutton** has been appointed to fill the vacancy, and **F. L. Schulze** is assistant sales agent for the Coke Department.

D. C. Phillips, Jr., has been placed in charge of the newly opened branch office of the Southwestern Coal Co., at Huntington, W. Va., his title being that of district manager. **R. S. Magee** is the president of the company.

W. J. Heatherman, formerly chief of the West Virginia Department of Mines and now general manager of the Cleveland Cliffs Iron Company's mine at Ethel, in the Logan field, was operated upon the latter part of June for appendicitis.

D. R. Phillips has been selected as assistant to General Manager Garner Fletcher of the Elkhorn Piney Coal Mining Company, with headquarters at Huntington, W. Va. Mr. Phillips was formerly connected with the C. & O. car allotment commission.

A. S. J. Southworth has resigned as secretary-treasurer of the General Coal Company of Huntington and secretary of the United States Block Coal Company, effective July 1, Mr. Southworth having disposed of his interest in the companies named.

F. L. Poindexter, superintendent of transportation of the Chesapeake & Ohio R.R., has been appointed as assistant to the general superintendent in charge of fuel, car allotment and distribution, and in that capacity succeeds **Fred J. Ginn**, head of the Car Allotment Commission of the road during the last five years. The understanding is that Mr. Glinn is to become superintendent in charge of stations on the staff of the general superintendent. The office of chairman of the allotment commission has been discontinued.

Howard N. Eavenson announces that he has resigned his position as chief engineer of the United States Coal & Coke Co., with mines at Gary, W. Va., and Lynch, Ky., and has opened an office as mining engineer at 230 Fifth Ave., Pittsburgh, Pa., where he will conduct a general mining engineering business, specializing in reports and valuations of coal lands and coal properties, the design and construction of coal plants, particularly those for by-product coking purposes, the improvement of existing plants to increase their capacity, efficiency and safety and in town planning and building.

Harry M. Urban has resigned from the position of general manager of the Woodward Iron Co. and **A. J. Boynton** of the National Tube Co., Loraine, Ill., has been named as general manager to succeed Mr. Urban. This announcement was authorized by Frank H. Crockard, president of the company. The resignation of Mr. Urban is effective immediately and Mr. Boynton will take up his new duties as early as possible. Mr. Urban was for some time superintendent of the by-product division of the Tennessee Coal, Iron & Railroad Co., with offices at Fairfield. He left the position when Mr. Crockard became president of the Woodward company to take the position as general manager of the latter company. Mr. Urban has made no announcement as to his future connection.

J. Ira Thoms, who for some time past has been the mine inspector of the fourth bituminous district of Pennsylvania with headquarters in Du Bois, has been transferred to Johnstown, in charge of the new district 13, extending north from Johnstown in the Cambria district, including the Nanty-Glo and La José districts, and running as far east in Clearfield County as Smoke Run and Madera. The new district was formed as a result of consolidation and redistricting recently completely by the Department of Mines.. A change in the eighth district, in charge of Mine Inspector **Joseph Knapper,** of Philipsburg, relinquishes the mines along the river division of the New York Central from Clearfield to Keating, now taken over by the fourth district in charge of Inspector **Sangan,** of Dubois, formerly in charge of the old thirteenth which was abolished.

Association Activities

Winding Gulf Operators' Association

Home fuel needs are to be taken care of as a result of action taken by the Winding Gulf Operators' Association. In other words, through the instrumentality of the association it is proposed to supply coal to dealers at such towns as Princeton, Beckley, Mullens and possibly other points on the Virginian Ry. at the price of $4 per ton.

Operators take the position that they should aid to the greatest extent possible in helping people living in the Winding Gulf region or close to it in meeting their fuel requirements even though operators have found it impossible to take care of the demand outside of the district even to filling contracts. The association will receive requests from the towns already named and will then divide such orders among the various plants.

The E. E. White Coal Co. has made known the fact that it will furnish at the tipple run-of-mine coal at the rate of $4 a ton to those who apply for such coal in trucks or wagons.

Washington Fuel Merchants' Association

Retail coal dealers and mine operators clashed in the convention of the Washington Fuel Merchants' Association at Spokane, Wash., on the question of cutting the coal prices in spring and summer in order to stimulate production. B. D. Mills, of the Seattle Coal & Fuel Co., argued that the operators should reduce their prices in May, June and July and make up the margin in the latter months of the year. This was strenuously objected to by several operators, including H. Hayward, of Salt Lake, representing the Rock Spring company.

All the speakers agreed that the industry should be stabilized by educating the public to buy in the summer. It was proposed by the operators that a fair-minded committee of men from both branches of the industry take up the problem.

Claims for a shortage in coal shipments against a railroad company were also discussed. R. S. Brown, traffic manager of the Western Retail Lumbermen's Association, told the fuel men of methods that were successful and of others that had proved unsuccessful.

The railroads were loath to settle claims for shortage in weight, and asked that an allowance of two per cent be permitted. Individual effort would not be successful in bringing the carriers to the proper attitude on settlement of claims; only through co-operation could shippers cope with pilfering and other losses while coal is in transit.

Publications Received

Quarry Accidents in the United States During the Calendar Year 1918—By Albert H. Fay. Not illustrated; pp. 52; 6 x 9 in.

Safe Storage of Coal. By H. H. Stoek. Department of the Interior. Bureau of Mines. Technical Paper 235. Illustrated; pp. 10; 6 x 9 in.

Development of Liquid Oxygen Explosives During the War. By George S. Rice, Department of the Interior. Bureau of Mines. Technical Paper 243. Illustrated; pp. 46; 6 x 9 in.

Perforated Casing and Screen Pipe in Oil Wells. By E. W. Wagy. Department of the Interior, Bureau of Mines. Technical Paper 247. Petroleum Technology 55. Illustrated; pp. 48; 6 x 9 in.

Electrometallurgical and Electrochemical Industry in the State of Washington. By Charles D. Grier. Engineering Experiment Station, University of Washington. Bulletin 5. Illustrated; pp. 45; 6 x 9 in.

Effects of Gasoline Removal on the Heating Value of Natural Gas—By Donald B. Dow. Department of the Interior. Bureau of Mines. Technical Paper 253. Illustrated; pp. 23; 6 x 9 in.

Artesian Waters of Northeastern Illinois. By Carl B. Anderson. State of Illinois, Department of Registration and Education. Division of the State Geological Survey, Urbana, Ill. Bulletin 34. Illustrated. Pp. 326; 7 x 10 in.

Coal in 1918. Part A. Production. By C. E. Lesher. Department of the Interior, Bureau of Mines. II-27. Mineral Resources of the U. S. 1918—Part II (Page 695-813). Published May 28, 1920. Illustrated; pp. 119; 6 x 9 in.

Annual Report of Coal Mines for the year ending Dec. 31, 1919, for the State of Washington. James Bagley, State Mine Inspector, Seattle, Wash. Not illustrated; pp. 53; 6 x 9 in. Statistical data and information about the coal mines of the state.

Coal-Mine Fatalities in the United States in 1919. By Albert H. Fay. Department of the Interior, Bureau of Mines. Bulletin 196. Not illustrated; pp. 86; 6 x 9 in. In addition to data about coal-mine fatalities, facts are given relative to approved mining equipment and permissible explosives.

Mining Preparing Domestic Graphite for Crucible Use. By George D. Dub and Frederick G. Moses. With a chapter on methods of analysis used by the Bureau of Mines, by G. B. Taylor and W. A. Selvig. Department of the Interior. Bureau of Mines. Bulletin 112. Illustrated; pp. 80; 6 x 9 in.

Development of Liquid Oxygen Explosives During the War—By George S. Rice. Department of the Interior. Bureau of Mines. Technical Paper 243. Illustrated; pp. 46; 6 x 9 in. Attention is called to the possibilities of liquid oxygen and carbonaceous material as an explosive compound to serve as a substitute for powder and dynamite.

Coming Meetings

American Mining Congress will hold its annual meeting at Denver, Col., Nov. 15. Secretary, J. F. Callbreath, Munsey Building, Washington, D. C.

American Institute of Mining & Metallurgical Engineers will hold its fall meeting Aug. 20 to Sept. 3. It is proposed to leave Buffalo by steamer and cruise through the Lakes, the first stop being at Houghton, Mich., after which the party will visit Duluth and the Iron Ranges of Minnesota, spending a day or two in Minneapolis on its return. Secretary, Bradley Stoughton, 29 West 38th St., New York City.

New York State Coal Merchants' Association will hold its annual meeting Sept 9, 10 and 11 at Richfield Springs, N. Y. Treasurer, G. W. F. Woodside, Albany, N. Y.

Illinois and Wisconsin Retail Coal Dealers' Association's annual meeting Aug. 4 and 5 at Milwaukee, Wis. Secretary, I. L. Runyan, Chicago, Ill.

The Rocky Mountain Coal Mining Institute, in conjunction with the Colorado Metal Mining Association, the local chapters of the American Mining Congress and the American Institute of Mining & Metallurgical Engineers, and the International First Aid Meet will hold its annual meeting Sept. 9, 10 and 11 at Denver, Col. Secretary, F. W. Whiteside, Denver, Col.

National Safety Council will hold its 1920 congress on Sept. 27 to Oct. 1, inclusive, at Milwaukee, Wis. General Manager, C. W. Price, Chicago, Ill.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 14 at McAlester, Okla. Secretary, F. F. La Grave, McAlester, Okla.